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Revision of the genus Ancilla Lamarck, 1799 (Mollusca: Olividae: Ancillinae)

by

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SYNOPSIS

The genus *Ancilla* Lamarck, 1799, contains 34 valid species and subspecies, nine of which are here described as new. These are *A. farsiana* from the Persian Gulf, *A. rouillardi* from South Africa, *A. chrysoma* from India, *A. sticta* from the Gulf of Aden, *A. iota* and *murrayi* from East Africa, *A. adelphe* and *A. thomassini* from the Malagasy–Mascarene region and *A. taylori* from the Indonesian archipelago.

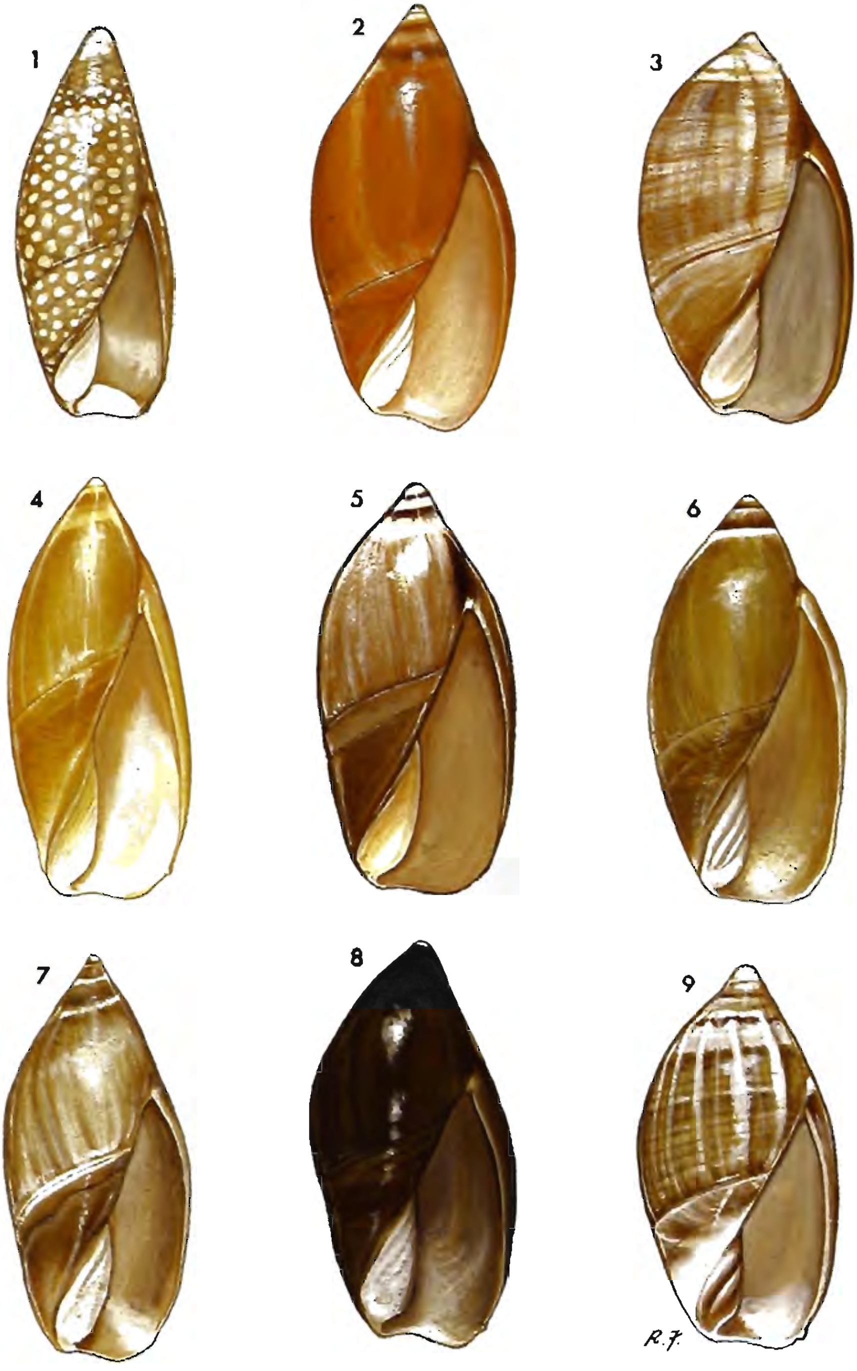
The genus *Ancilla* probably evolved from an *Ancillarina*-lineage during the Eocene. Subgenus *Javancilla* is proposed for *Ancilla boettgeri* Martin, 1914, an Eocene species with marked plesiomorphous characters. *Hesperancilla* is proposed for *A. matthewsi* Burch & Burch, 1967, of the Atlantic, whose *Ancilla*-like characters may be convergent. S.E.M. and light-microscope studies of radulae indicate two sister groups in the Indo-Pacific, with pectinate and tricuspidate rachidian plates respectively. In the absence of knowledge of dentition in *A. cinnamomea*, the type species of *Ancilla*, a final subgeneric classification cannot be proposed and a provisional system is utilised.

The subfamily Ancillinae of the family Olividae contains approximately 100 Recent species and subspecies. Of these, the temperate-water elements have been studied by modern workers in varying detail, but little has been published on the tropical species since the turn of the century. In particular the genus *Ancilla*, which has its centre of distribution in the western Indian Ocean, has been very inadequately investigated, and interpretation of its constituent species has been the subject of endless confusion in the literature. The present study, based on the collections of most of the major museums of the world, is an attempt at elucidating the systematics and taxonomy of the group.

CHARACTERS AND TERMINOLOGY

Shell morphology: Terminology is illustrated in Fig. 10. An earlier diagram (Kilburn, 1977) shows a more primitive ancillid (genus *Amalda*) in which the fasciolar band exhibits a plesiomorphous character-state in which it is divided into an anterior and posterior band; furthermore the entire shell is covered by primary callus in *Ancilla*, and the secondary callus is absent or restricted to the vicinity of the paries.

At species-level the significance of any one character has been found to vary with the species-complex and is consequently discussed in greater or lesser detail as the case merits. Colour-pattern for example, is diagnostic in some species, confusingly variable in others. Thus a total absence of coloration characterises such species as *Ancilla tronsoni*, *minima*, *inornata* and *scaphella*, yet, as pointed out by Coomans (1979) aberrant white shells (probably not true albinos) occur with varying frequency in many species of Ancillinae. According to the present



Figs 1–9. Coloration in the genus *Ancilla*: 1, *A. sticta* sp.n., holotype; 2, *A. ventricosa fulva* (Swainson, 1825), neotype; 3, *A. ventricosa ventricosa* (Lamarck, 1811); 4, *A. chrysoma* sp.n., holotype; 5, *A. cinnamomea* Lamarck, 1801; 6, *A. rouillardi* sp.n., holotype; 7, *A. acuminata* (Sowerby, 1859); 8, *A. castanea* (Sowerby, 1830); 9, *A. ovalis* (Sowerby, 1859).

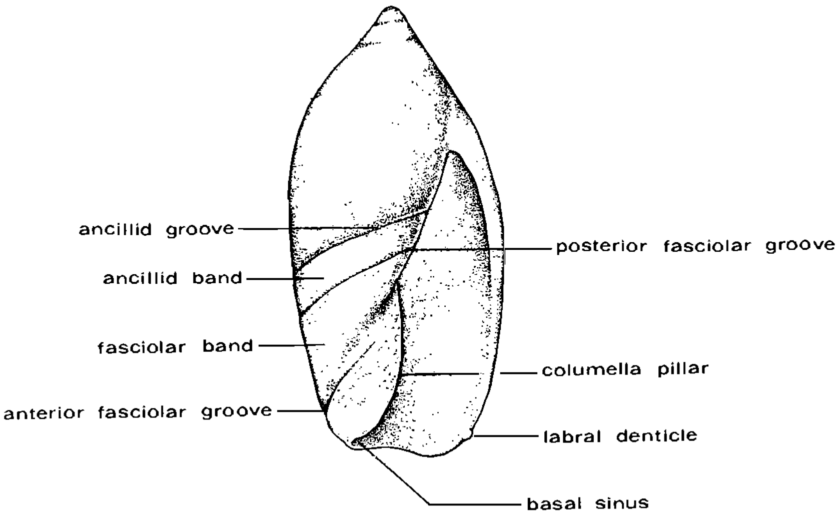


Fig. 10. Descriptive terms used for *Ancilla* species.

study white-shelled morphs are found in *Ancilla albisulcata*, *acuminata*, *ovalis*, *marmorata*, *albozonata*, *fasciata*, *matthewsi*, *djiboutina*, *castanea* and *exigua*.

Colour-terminology in the body of each description follows that of Kelly & Judd (1965), but a less objective and more colloquial equivalent is given in the diagnosis for the benefit of workers without access to an ISCC-NBS colour guide.

As in several other olivid groups, past overemphasis on colour and colour pattern as diagnostic features has led to much of the current confusion regarding species-limits. Equally important in the Ancillinae are details of shape, protoconch size, depth of siphonal notch, characters of the paries and columella, disposition of microsculpture and form of the ancillid band (where present).

Some aspects of shape and proportions are indicated quantitatively by ratios expressing maximum width and aperture length against total length. For these figures, only perfect fully-adult specimens have been utilised (unless otherwise indicated). Aperture length is measured from the anal angle to the extreme base of the shell; the aperture/total length ratio provides an indirect and approximate reflection of the height of the spire, which cannot be measured directly due to the sutures being masked by callus. Length of the columella pillar, expressed as a ratio against the length of the labium (measured from the basal sinus of the columella to the posterior end of the paries) is a useful character in some cases. The term 'columella pillar' (equivalent to the 'pillar structure' of Olsson, 1956) is used in preference to 'columella' which is technically correct but too frequently misapplied to the entire labium. Number and disposition of columella lirae (pleats)—the only useful meristic character found in the group—may be surprisingly constant within narrow limits. In juveniles lirae may of course be fewer than in adults of the same species, although the lack of good growth series has hindered investigation of this. Characters of the ancillid band include its level (whether flush, sunken or declivous) and its width which may be expressed as a ratio against the width of the fasciolar band taken at the labium (when the absence of parietal callus permits its measurement).

Although most Recent *Ancilla* spp. (*A. taylori* and *A. exigua sulcata* are notable exceptions) are superficially smooth, save for growth-lines, under magnification areas of microscopic pustules are seen, here referred to as microshagreen sculpture (Fig. 11). This occurs mainly on the columella pillar, paries, fasciole and back of labrum. Although SEM studies have revealed no interspecific differences in pustule shape, their extent and size can prove useful. The paries itself may bear a peculiar erosion-like concavity, here termed a parietal 'scar', whose presence helps to characterise several species. The paries may also show a weak longitudinal ridge.

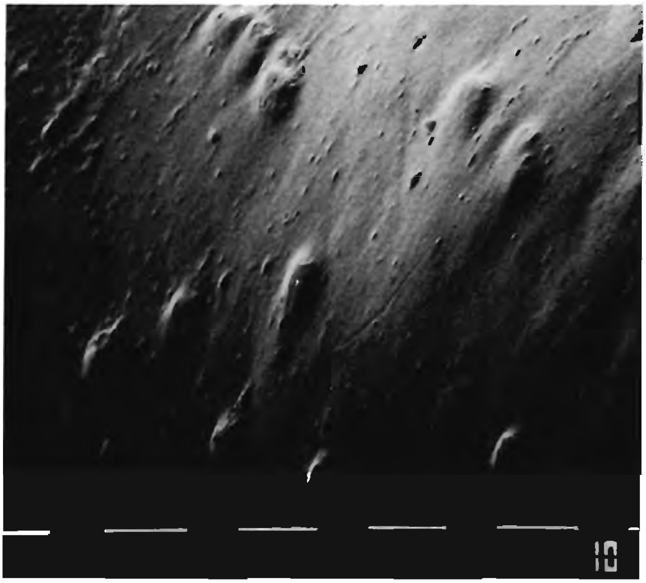


Fig. 11. Microshagreen sculpture in *Ancilla taylori*; SEM photograph. Scale line = 0,01 mm.

In practically all species of *Ancilla* the protoconch is smooth, vitreous and narrowly domed, with about 1,5 whorls; size and details of shape differ between species. Unfortunately, the protoconch/teleoconch transition may be very indistinct, while sutural callus often overlaps the protoconch base to such an extent that precise determination of its diameter is impossible.

Operculum: The operculum in *Ancilla* is translucent to transparent yellow, with an adapical, slightly internal nucleus; the outer surface bears growth lines and radial striae. It varies in size and shape between species, but unfortunately, due to its fragile nature, is often damaged or malformed, and in the case of badly preserved specimens is easily detached and lost. Details are thus unknown for many species. In one (*A. castanea*) an operculum appears to be always absent.

Anatomy: Externally, the bodies of all *Ancilla* personally examined have been pale in colour, usually finely speckled or mottled with brown but sometimes (*farsiana*, *tronsoni*) almost colourless (in preservative). As in most other ancillid genera the foot is capable of considerable expansion, with flap-like parapodia which in life may almost completely cover the shell (Fig. 12). Together with the ploughshare-like propodium these help to shape the creature into a burrowing wedge, permitting it to push its way rapidly through the surface layers of sand. The tentacles are flap-like, with eyes buried below the surface tissues. The metapodium is not bifurcate behind as in *Ancillista* and (to a lesser extent) *Amalda*.

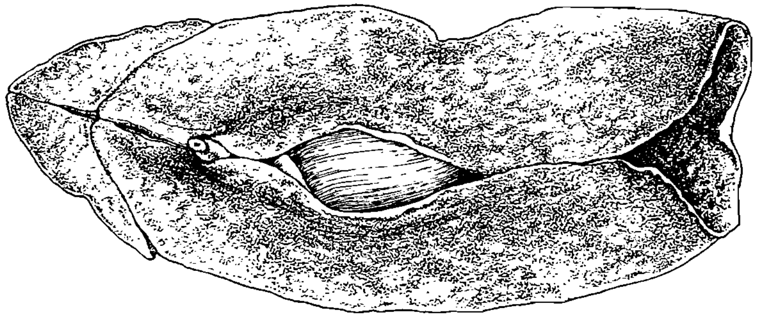
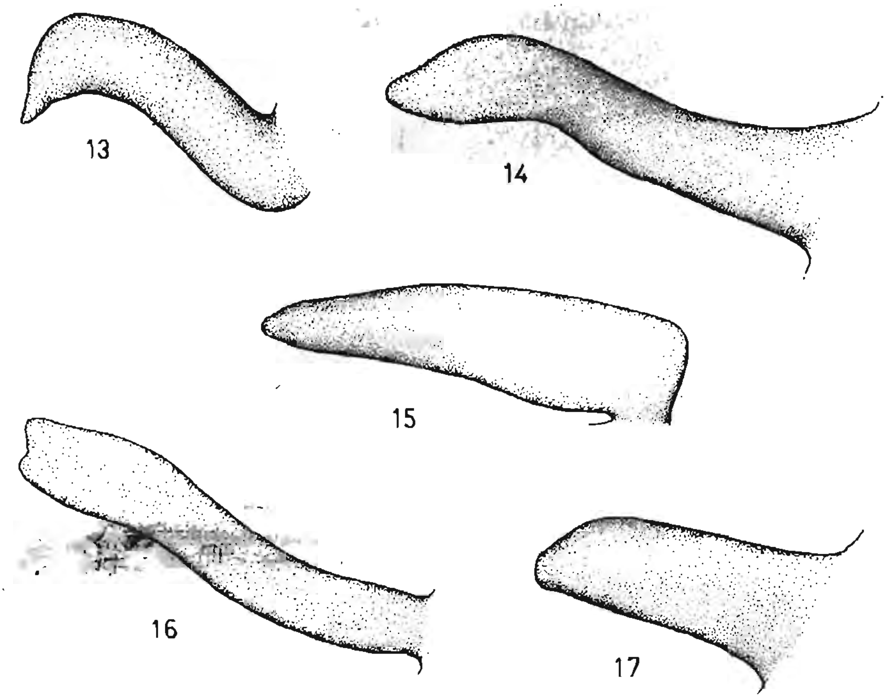


Fig. 12. Living example of *Ancilla sarda*. Redrawn from photographs (courtesy Mr F. Pinn).

The penis (Figs 13–17) appears to vary slightly in shape, although allowance must be made for the effects of preservation. In none of the six species examined, however, was a terminal appendage or flagellum present, such as occurs in at least some *Amalda* spp.

Examination of internal anatomy has been hindered by the poor state of preservation of most of the specimens available. In several cases, however, the foregut could be studied in some detail. The account given by Marcus & Marcus (1968) for *Amalda dimidiata* applies equally to *Ancilla*, save (as noted by them) that a left accessory salivary gland is [generally] present in the latter. In most species examined (*Ancilla ventricosa*, *castanea*, *farsiana*) the left gland is smaller than the right, but in individual *A. castanea* it may be subequal in size, or even absent. The single example of *A. albozonata* that was dissected appeared to show only a right accessory gland. True salivary glands varied in size from rather small (*A. castanea*) to relatively large (*A. albozonata*, *ventricosa*). In *A. ventricosa* the unpaired forgut gland is particularly large, sometimes exceeding the shell in length.

Radula: The rachidian plate displays two distinct character-states within the genus *Ancilla*, as here defined. In most species this plate is tricuspidate (Fig. 18), with three strong, relatively close-set cusps, and small intermediary denticles. In a few species, however, the rachidian is pectinate (Fig. 19), the three main cusps being widely-spaced and separated by 2–4 intermediary cusps, which may resemble



Figs 13–17. Penes of *Ancilla* species. 13, *A. exigua sulcata*; 14, *A. castanea*; 15, *A. v. ventricosa*; 16, *A. ovalis*; 17, *A. tronsoni*.

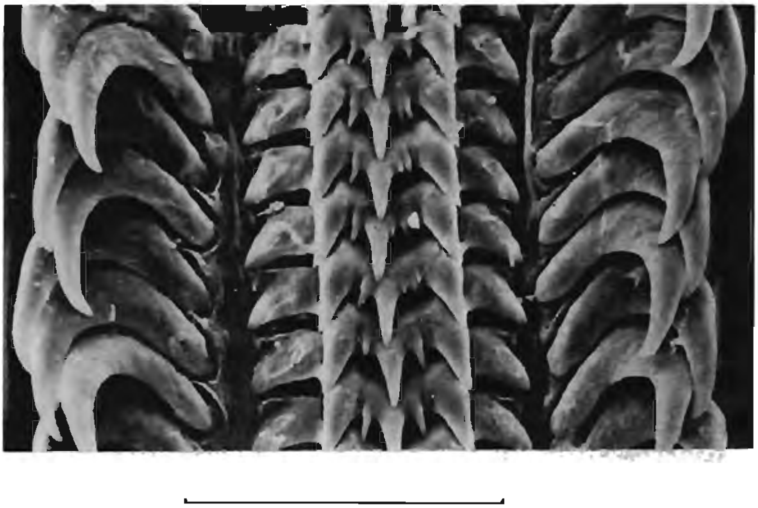


Fig. 18. Radula of *Ancilla tronsoni*, showing tricuspidate rachidian plates; SEM photograph, air-dried specimen; 'Persian Gulf' Scale line = 0,1 mm.

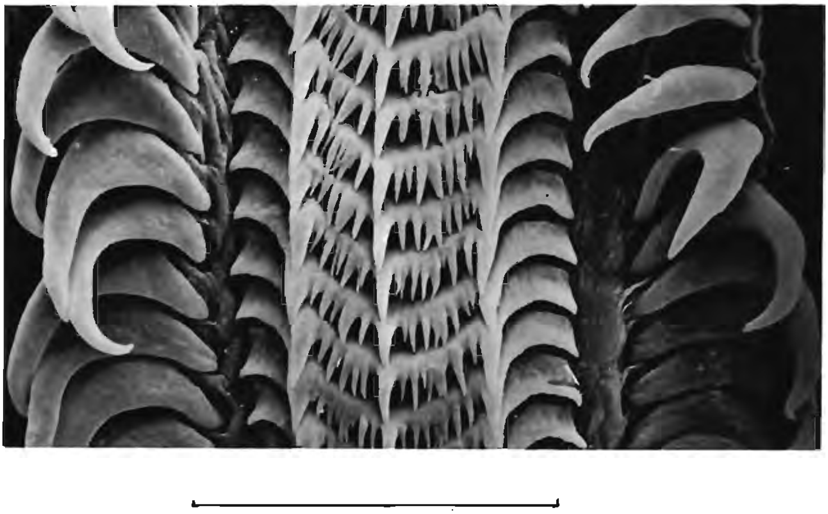


Fig. 19. Radula of *Ancilla acuminata*, showing pectinate rachidian plates; SEM photograph, air-dried specimen; 'Red Sea'. Scale line = 0,1 mm.

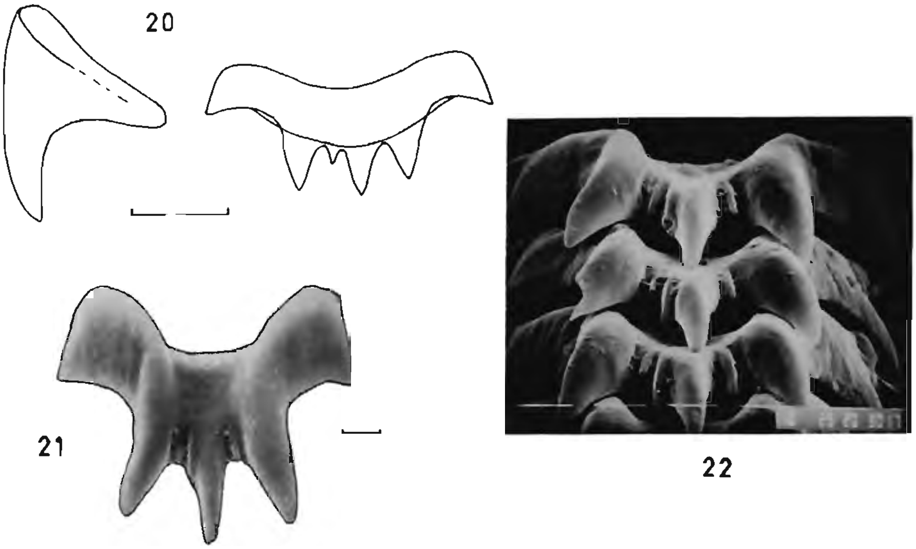
them in length. The tricuspidate character-state is obviously the plesiomorphous one, being found in all other olivid genera (save for members of the Olivellinae), as well as occurring persistently in most other rachiglossate families. The two lineages are rather well defined, only one species, *A. thomassini*, showing a potentially intermediate state, in which the three cusps are strong but well spaced. Whether such closely-related sister groups should be treated as full genera is a matter of personal opinion, but a conservative approach is here preferred.

In the present study radulae were examined using SEM and light microscope methods. Results obtained by these two methods were fully comparable in the case of pectinate rachidians. Where tricuspidate rachidians are concerned, however, a slight change in shape accompanied the standard air-drying process preparatory to SEM examination. This distortion appears to be the result of increased curvature of the plate about the median, causing it to appear narrower in face view (Figs 20–22). Such changes would be minimised by freeze- or critical point drying, but fortunately structural details remain unaltered and the degree of final curvature is constant for a given species. Because of the age and consequent brittleness of some of the material preparatory cleaning was kept to a minimum.

The rachidian plates are often slightly asymmetrical, particularly with regard to the size and number of intermediary denticles. The latter usually vary not only along the length of the ribbon, but generally differ on either side of the same plate. Relative length of the three main cusps may also vary with the individual.

Lateral plates appear to show significant differences between species, but as their apparent shape is greatly altered by the angle at which they are viewed, their practical value as a taxonomic character is debatable.

Distribution: Most museum specimens of *Ancilla* originate from pre-20th century collections or from early shell-dealers, as witness the monotonous repetition of



Figs 20–22. Radula plates of *Ancilla castanea*, showing effects of air-drying. 20, Camera lucida drawing, using compound microscope, scale line = 0,05 mm; 21, SEM photograph of air-dried rachidian, scale line = 0,01 mm; 22, Edge view of latter, showing curvature, line = 0,01 mm.

standardised localities such as 'Red Sea', 'Ceylon', 'Zanzibar' or 'Aden'. Literature records are even more unreliable, on account of the frequency with which ancillids have been misidentified. A highly critical approach to locality data has consequently been necessary. In general, only confirmed or evidently reliable data are accepted for the purpose of establishing the probable range of each species; additional localities within its proven range are usually accepted at face value.

Habitat data: Like members of other ancillid groups, *Ancilla* species burrow shallowly in sand or mud from low tide down to about 365 metres. In general, waters of average to high salinity are preferred in contrast to lower salinities (see below). Little direct information is available for any species, although useful data have sometimes been culled from labels or published sources. In some cases sufficiently detailed hydrological information is available for the environmental parameters of a particular species to be defined in more detail. Unfortunately such data are not available for many areas or else are doubtfully applicable to the normal habitat of a species.

Biogeography: An integrated biogeographical analysis of the Ancillinae awaits completion of the remainder of this study. At this stage it may be noted that 67,7% of the 31 Recent species of *Ancilla* (subspecies excluded) occur in the tropical western Indian Ocean (East Africa to the Red Sea and Persian Gulf); the largest percentage (38,7%) inhabit the Red Sea and Gulf of Aden. The genus barely reaches the West Pacific Arc, where only 6,5% of species occur, these being evidently restricted to Indonesia and its vicinity. None reach Australia, save for a single record from the adjacent Coral Sea. In general *Ancilla* is poorly represented in areas of low salinity (only 16,1% of species are known from the Bay of Bengal), from oceanic islands (19,4%) and temperate waters (9,7% in South Africa).

ORIGINS OF THE GENUS *ANCILLA*

The fossil record of *Ancilla* is scanty, but it would appear that the genus arose in the Tethys Sea from an *Ancillarina*-type ancestor, probably during the Cretaceous or Eocene. The group did not, however, undergo extensive radiation until the late Tertiary or even the Quaternary. The earliest-known true *Ancilla* is probably *A. boettgeri* Martin (1914: 133, pl. 2, fig. 67) of the upper Eocene Nanggoelan beds of Java (Fig. 23). This species was somewhat similar in general appearance to the Recent *Ancilla ampla* but had an extremely long columella pillar (0,7–0,8 of labial length). More significantly, the fasciolar band was divided into two by a shallow groove, a plesiomorphic state found in other ancillid genera and sometimes indicated in members of the subfamilies Olivellinae and Agaroniinae, but absent in Recent *Ancilla*. The extinct genus *Ancillarina* Bellardi, 1882 (type species, s.d. Palmer (1937), *Ancilla canalifera* Lamarck, 1802) contains *Ancilla*-like species with a similarly divided fasciolar band but a total lack of callus on the spire whorls and sutures. *A. boettgeri*, for which the subgenus *Javancilla* is here proposed, is thus a possible stem-species from which Recent *Ancilla* were derived. *Ancillarina* was evidently represented in the same beds by *Ancilla jogjacartensis* Martin (1914: 132) and its probable synonym, the fragmentary *A. puruensis* Martin (1914: 132) (Figs 24–27). *Ancilla (Sparellina) poenitens* Vredenburg (1923: 251, pl. 14, figs 5a, b), based on very poorly preserved material from the Cretaceous of Burma, was either an *Ancilla* or an *Ancillarina*. *Ancillarina* itself probably evolved as a sister group of the primitive genus *Olivula* Conrad, 1832.

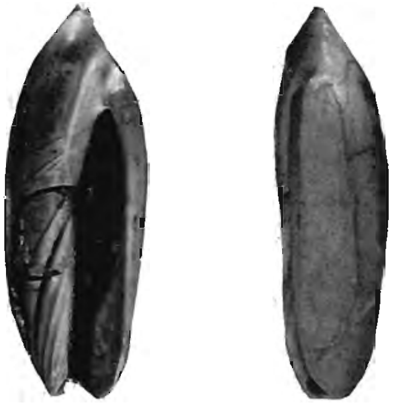
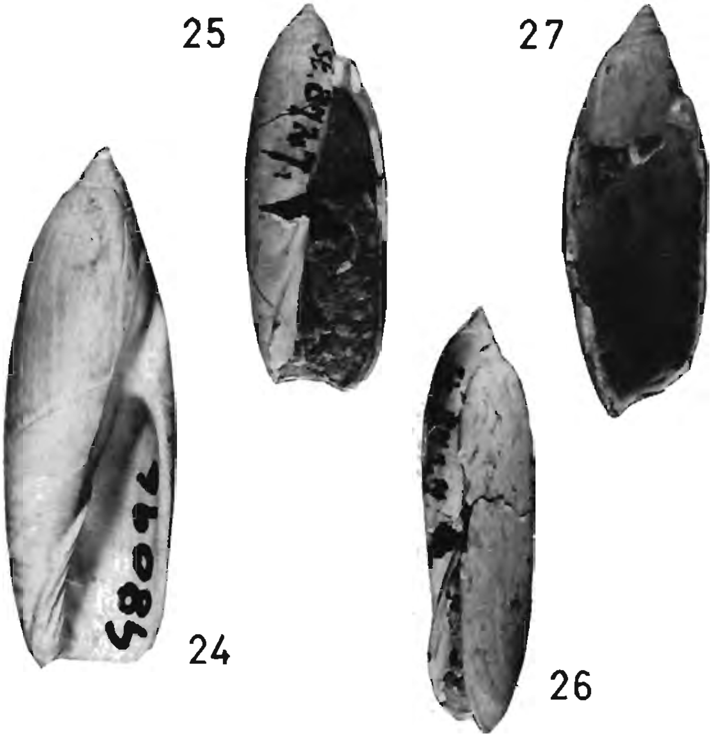


Fig. 23. *Ancilla boettgeri* Martin, 1914, from the Eocene of Java, the earliest known *Ancilla*. Photographs of holotype, courtesy RGL.



Figs 24–27 *Ancillarina* species. 24, *A. canalifera* Lamarck, 1802, Eocene (Lutetien), Fercourt, France, NM G8096. 25–26, *A. jogjacartensis* Martin, 1914, from Eocene of Java, holotype; 27, *A. puruensis* Martin, 1914, same as last, holotype. Photographs 25–27 courtesy of RGL.

The phylogenetic relationships of the sole western hemisphere species, *Ancilla matthewsi* Burch & Burch, 1967, require further investigation. The possibility exists that its *Ancilla*-like characters are convergent and that *matthewsi* is actually an offshoot of an *Amalda* or *Eburna* lineage. Possible precursors were *Ancillaria lamellata* Guppy (1866: 579, pl. 26, fig. 9) and *Ancilla paralamellata* Mansfield (1925: 33, pl. 5, figs 2, 7) from the Miocene of Trinidad, which resemble *matthewsi* in possessing a parietal pleat. In turn these two species show a distinct phenetic resemblance to *Eburna nitida* (Wanner & Hahn, 1935) from the lower Miocene of Java, save that in the latter, as in Recent *Eburna* from the western Atlantic, the parietal callus has separated from the body wall to form a false umbilicus. Certainly no true *Ancilla* appears to be known from the western Tethys Sea, and even as early as the Cretaceous the Proto-Atlantic basin would presumably have formed a barrier to the migration of elements of such low vagility as the Ancillinae. The radula of *matthewsi* is certainly typical for the genus *Ancilla*, but this organ is unfortunately unknown in *Eburna*. The peculiar crenulated ancillid groove of *matthewsi* appears to be an autapomorphy. Until its characters can be confidently assessed, one must retain the species in *Ancilla* on phenetic grounds.

TAXONOMY

Family Olividae Swainson, 1840

Subfamily Ancillinae Cossmann, 1899

Genus *Ancilla* Lamarck, 1799

Ancilla Lamarck, 1799: 70. Type species *Ancilla cinnamomea* Lamarck, 1801 (ICZN Opinion 579)
Anaulax Roissy, 1805: 430. Type species (s.d. Eames, 1952) *Ancilla cinnamomea.*
Ancillaria Lamarck, 1811: 303. Type species (s.d. Children, 1823) *Ancilla cinnamomea.*

Diagnosis: External surface of shell (save for protoconch and columella pillar) covered by enamel-like callus; base with a single fasciolar band (except in one Eocene species), and usually an ancillid groove and band posterior to it; columella pillar more or less strongly spirally twisted and bearing a series of oblique lirae. Operculum thin and translucent or transparent, with an adapical, non-terminal nucleus, sometimes totally absent. Metapodium of foot not bifid behind; penis without a terminal appendage or flagellum; accessory salivary glands usually two in number. Radula with tricuspidate or pectinate rachidian plates.

Systematics: The question of the type species of *Ancilla*, a genus established without citation of a nominal species, was one of dispute until resolved by ICZN Opinion 579 of 1959. Eames' 1952 designation of *Ancilla cinnamomea* as type species of *Anaulax* Roissy, 1805, predates Chavan's 1965 designation of *Voluta ampla*, so that the name becomes an objective junior synonym of *Ancilla* Lamarck, 1799. Both *Anaulax* and *Ancillaria* were originally proposed as amendments to the name *Ancilla*, because of its supposed resemblance to 'le nom d'ancille' [= the freshwater pulmonate *Ancylus*].

Study of the foregut, male genitalia and operculum has provided no grounds for subdivision of the genus *Ancilla*. However, shell and radular characters provide useful data which indicate that several natural subgenera can advantageously be recognised.

On shell-features Chavan (1965) accepted three subgenera of *Ancilla*, namely the nominate one, whose members possess an ancillid groove, *Sparella* Gray, 1857, and *Chiloptygma* [= *Chilotygma*] H & A Adams, 1853, which lack one; the last differs from *Sparella* in possessing a parietal tooth. Unfortunately the latter character may be convergent, as a similar tooth occurs in American species probably unrelated to *Chilotygma*. Moreover, Chavan's definition of *Ancilla* ss. would encompass species with both pectinate and tricuspidate rachidians, which certainly represent different lineages. Unfortunately, concordance between shell and radular characters is very limited; thus species-pairs such as *A. eburnea*/*farsiana* and *A. acuminata*/*boschi*, which closely resemble one another in shell-characters, possess totally different radulae. While loss of an ancillid groove appears to be a synapomorphy by which *Chilotygma and Sparella* (*sensu* Chavan) can be accepted as a valid lineage, any attempt at providing a final classification is frustrated by our lack of knowledge of the dentition of the type species of *Ancilla*, *A. cinnamomea*. As explained above, a deductive approach based on shell-characters is not feasible, so that a definition of the nominate subgenus is not at this stage possible. A provisional classification is here proposed, using the name

Sparella for those species with a tricuspidate rachidian and *Sparellina* for those with a pectinate one, although of course it is highly probable that one or the other will ultimately fall as a synonym of *Ancilla* ss. In this sense *Sparella* is a 'non-A' group (*sensu* Eldredge & Cracraft, 1980) and should be divided further; two sister-groups, one possessing an ancillid groove, one (= *Sparella* ss + *Chilotygma*) without, would appear to be represented. As the ancillid groove is an undeniable apomorphy, its loss can be regarded as a character reversal.

Provisional subgenera of *Ancilla*

Javancilla sgen. n. Type species *Ancilla boettgeri* Martin, 1914, Eocene of Java. Shell as in *Sparellina* (*infra*), but fasciolar band divided by a ridge and columella pillar extremely long.

Sparellina P. Fischer, 1883: 600 [? = *Ancilla* ss.] Type species (by monotypy) *Ancilla candida* Lamarck, 1811 [= *Voluta ampla* Gmelin, 1791]. Rachidian plate of radula with main cusps widely separated, intermediary denticles strong and comb-like. Ancillid groove present (? in all); paries without a projection.

Sparella Gray, 1857: 26. Type species (s.d. Cossmann, 1889) *Ancillaria ventricosa* Lamarck 1811. Rachidian plate with three relatively close-set main cusps and weak intermediary denticles. Ancillid groove sometimes absent; paries without a projection.

Chilotygma H. & A. Adams, 1853: 149 (= *Chiloptygma* Fischer, 1883: 600, unjustified emendation). Type species (by monotypy) *Ancillaria exigua* Sowerby, 1830. Radula as in *Sparella*, but rachidian sometimes more strongly arched. Operculum relatively large. Paries heavily calloused, with a swelling or tooth-like process anteriorly; ancillid groove absent.

Hesperancilla sgen. n. Type species *Ancilla matthewsi* Burch & Burch, 1967. Shell resembling *Chilotygma* but with a conspicuously crenulated ancillid groove; labral denticle not at level of ancillid groove. Rachidian plate as in *Sparella* but with a weak median cusp.

In view of the provisional nature of this classification, it is not used as a basis for dividing the systematic body of this paper. Instead, species are covered in a pragmatic sequence that reflects shell similarities rather than putative phylogenetic relationships. In this way identification will be facilitated.

The *Ancilla cinnamomea* species-complex

When describing *Ancilla cinnamomea*, Lamarck erroneously cited for his species a figure of a juvenile *Cypraea*. Although he later corrected his mistake, subsequent authors such as Swainson and Sowerby were unable to agree as to the correct interpretation of the name; this confusion—perpetuated to this day—culminated in Tryon (1885: 93) synonymising under the name *cinnamomea* most of the described species of *Ancilla*. Many recent authors have followed suit.

The following key, based on shell-characters, supplemented by use of the figures, should aid in separating those species most closely resembling *A. cinnamomea*. Totally dissimilar elements such as *A. castanea* and *A. ventricosa*, which have often been confused with *cinnamomea*, are excluded. However, it should be noted that even the restricted *cinnamomea* species-complex is a polymorphic one. Although the radulae of most are unknown, those of *A. rouillardi* and *A. boschi* indicate them to belong to a different lineage to *A. acuminata* (and presumably *albisulcata*).

Key to species closely resembling *A. cinnamomea*

1. Colour golden-yellow, with a very diffuse milky zone below suture .... **chrysoma**
– Ground colour not as above 2

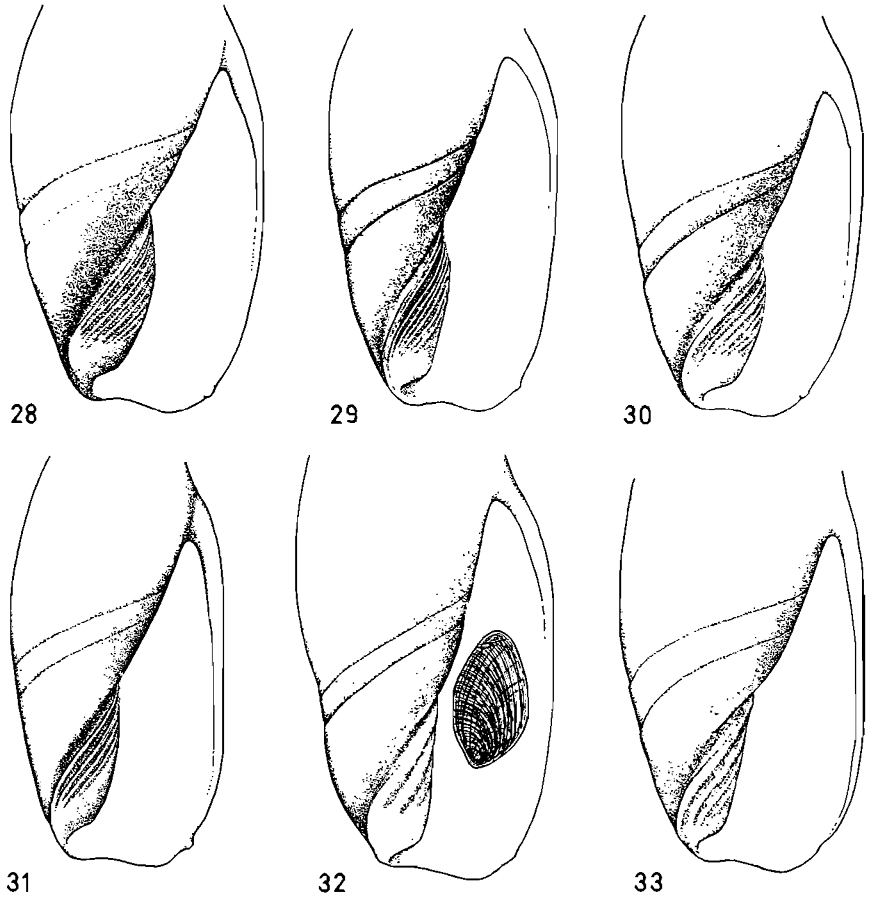
2. Columella lirae 3–5; siphonal notch barely indented; microshagreen sculpture usually extending over ancillid band 3
– Columella lirae 6–11; siphonal notch shallowly indented; microshagreen sculpture rarely if ever extending over ancillid band 5
3. Ancillid groove reaching labrum, containing a white line and ending in a denticle 4
– Ancillid groove obsolete behind labrum, without a white line or lip denticle .... **rouillardi**
4. Base scarcely oblique; columella pillar usually convex, with 3–5 lirae; posterior white zone at suture; suture bordered above by brown callus .... **djiboutina**
– Base oblique, columella pillar straight, with 2–3 lirae; posterior white zone situated well below suture; no brown callus above suture .... **boschi**
5. Basal white line restricted to ancillid groove; columella typically brownish orange; maximum width median; base moderately oblique; a strong, white band below suture; Indian .... **cinnamomea**
– Basal white line extending on either side of ancillid groove; columella white or faintly tinged with orange; maximum width posterior to middle; base distinctly oblique; Red Sea/Gulf of Aden 6
6. Columella lip posteriorly convex, with 7–11 lirae; ancillid band moderately declivous; paries without a 'scar'; posterior white zone and anterior line diffuse .... **albisulcata**
– Columella lip evenly convex, with 6–9 lirae; ancillid band strongly declivous; paries with a distinct sunken 'scar'; posterior white band and anterior line distinct .... **acuminata**

Ancilla cinnamomea Lamarck, 1801

Figs 5, 28, 34–41

Porphyria staphylea Röding, 1798: 36 (cites Chemnitz, 1788: pl. 147, fig. 1381) (**syn. n.**). Type locality: unknown ['Tranquebar und Guinea' (Chemnitz)].
Ancilla cinnamomea Lamarck, 1801: 73 (cites Martini, 1773: pl. 65, fig. 731) (*nomen conservatum*). Type locality: unknown.
Ancillaria cinnamomea; Lamarck, 1811: 304; *idem*, 1816: 1, pl. 393, figs 8a, b; *idem*, 1822: 413; Sowerby, 1830: 4, figs 10–13; Kiener, 1844: 24, pl. 1, fig. 2; Sowerby, 1859: 59, pl. 212, figs 33–35; Reeve, 1864: pl. 7, fig. 19; Weinkauff, 1878: 19, pl. 3, figs 7, 8, pl. 4, figs 3, 4.
Sparella cinnamomea; Gray, 1865: 37.
Ancilla cinnamomea; Martin, 1895: 69, pl. 9, figs 154–155; Cossmann, 1903: 115, pl. 3, figs 14, 15; Martin, 1928: 11; Gravely, 1942: 63; Satyamurti, 1952: 192, pl. 18, fig. 6.
Ancilla cinnamonea [sic]; Fischer von Waldheim, 1807: 163.
Ancilla coccinea Fischer von Waldheim, 1807: 163 (cites Chemnitz, 1788: pl. 147, fig. 1381) (**syn. n.**). Type locality: 'Mers Occidental'.
Bulla cypraea (*non* Linné); Dillwyn, 1817: 490.
Ancilla brunea Schumacher, 1817: 244. Type locality not stated.
Ancillaria effusa Swainson, 1825: 275; Sowerby, 1830: 4, figs 8, 9; Kiener, 1844: 21, pl. 6, fig. 4. Type locality: unknown.
Sparella effusa; Gray, 1865: 37.
Ancilla albifasciata Swainson, 1825: 276; Reeve, 1864: pl. 7, fig. 20. Type locality: East Indies.
Ancillaria cinnamomea var *albifasciata*; Weinkauff, 1878: 11, pl. 4, figs 3, 4.
Ancillaria albofasciata [sic]; Sowerby, 1859: 59, pl. 212, fig. 36.

Diagnosis: Shell more or less oblong-ovate, greatest width approximately median, 0,45–0,54 of length; spire angle 67°–93°; aperture 0,63–0,74 of total length, base scarcely to moderately oblique, siphonal notch fairly shallow; columella pillar



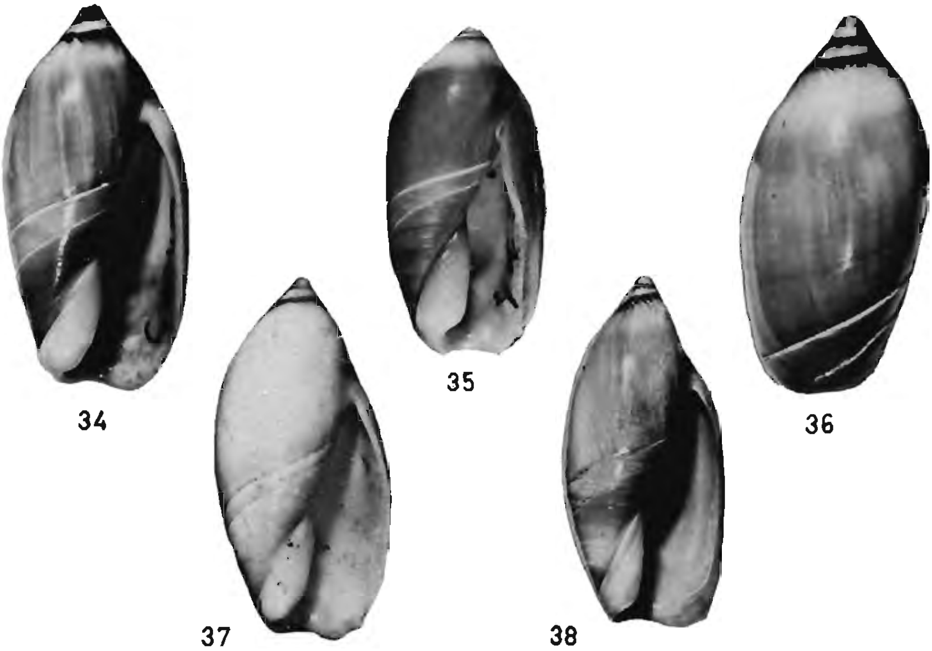
Figs 28–33. *Ancilla* species, base of body whorl. 28, *A. cinnamomea* Lamarck, 1801; 29, *A. albisulcata* (Sowerby, 1830); 30, *A. acuminata* (Sowerby, 1859); 31, *A. djiboutina* (Jousseaume, 1894); 32, *A. boschi* Kilburn, 1980; 33, *A. inornata* (E. A. Smith, 1879).

strongly twisted with a convex edge and 7–11 evenly-spaced lirae; fasciolar band microshagreened only along siphonal margin; paries without a sunken 'scar' in adult; deep chestnut-brown, fasciolar and ancillid bands often darker, with a wide, well-defined white band immediately below suture, and a dark chestnut band showing above suture; ancillid groove sometimes white, columella usually orange-tinged; rarely pure white with a brown suprasutural line. Maximum adult length 36,8 mm.

Description:

Quantitative (N = 43):

Breadth/length: 0,45–0,54 (M = 0,49; SD = 0,02)
Aperture/total length: 0,63–0,74 (M = 0,70; SD = 0,03)
Spire angle: 67°–93° (M = 77°; SD = 6,8°)
Maximum dimensions: 36,8 × 16,5 mm
Minimum adult dimensions: 20,6 × 10 mm.



Figs 34–38. *Ancilla cinnamomea* Lamarck, 1801: 34, 36, Madras, NM G7847, 24,9 × 12,1 mm; 35, Loc.?, lip deformed, RNHL colln., 25,3 × 12,4 mm; 37, Pale form, Madras, NM G8841, 30,6 × 15,1 mm; 38, Narrow example, Ceylon, BM(NH) 75.4.8.52, 32,5 × 15,1 mm.

Shell oblong-ovate to ovate-cylindrical, greatest width approximately median; body whorl with gently convex sides and no sign of a shoulder. Spire relatively low, orthoconic to slightly cyrtoconic, not strongly calloused, suture flush, apex slightly papilliform. Aperture acute posteriorly, widest medially, curved and somewhat effuse basally, siphonal canal wide and shallowly notched, columella pillar only moderately foreshortened, rendering base somewhat oblique. Surface smooth, with weak growth lines which are somewhat arcuate across the sutures; columella pillar and its bordering furrow, and labrum and paries microshagreened, this sculpture obsolete on fasciole except along margin of siphonal notch. Ancillid band approximately 0,40–0,68 width of fasciolar band at labium, profile gently convex, often slightly declivous, ancillid groove deep, ending in a small, blunt denticle, fasciolar band gently convex. Columella pillar oblique, rather broad, subequal in length to paries, its inner edge moderately to strongly convex, with a conspicuous basal sinus; surface with 7–11 thin, subequal, oblique lirae, outer one seldom separated by a groove; anterior fasciolar groove shallow. Paries slightly curved, parietal ridge feeble or absent, parietal callus more or less restricted to posterior angle of aperture; juveniles sometimes with a sunken 'scar' on paries. Labrum moderately thickened in adult, particularly so posteriorly.

Teleoconch whorls about three in number. Protoconch (Fig. 41) of about 1,5 whorls, maximum diameter, 1,6–2,0 mm; shape narrowly domed.

Colour typically brownish-orange to strong brown, fasciolar band often somewhat darker, with a broad, relatively well-delimited white band immediately

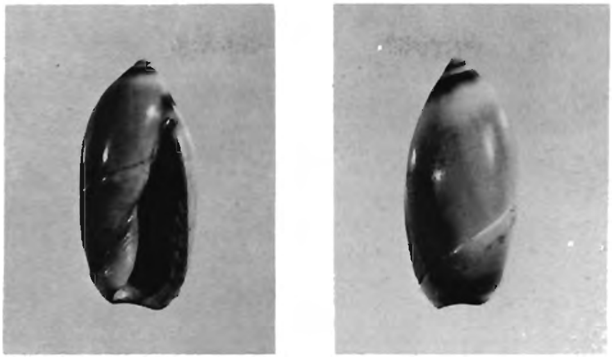


Fig. 39. *Ancilla cinnamomea* Lamarck, 1801, holotype; MHNG 1354/52. Photographs courtesy of MHNG.

below suture, parietal callus strong reddish-brown, forming a narrow suprasutural band of that colour, the spire being thus patterned with alternate white and brown zones; ancillid groove usually paler than adjacent surface or even white, but never encompassed by a white band; columella pillar usually light brownish-orange, occasionally white. A pale form is equally common; here the ground colour varies from medium orange-yellow to pure white, only the suprasutural callus showing a reddish-brown hue; the columella pillar is white.

Distribution (Fig. 40): South-eastern India, from the Gulf of Manaar to the Coromandel coast, and Sri Lanka.

Material examined: INDIA (NM H9679: W. Falcon, one; S. D. Kaicher colln. one): Madras (NM G7847: A. R. Bhagat, four; NM G8841, purchased 'World Shells', two; NM G8504: D Peled, one); Tuticorin, Gulf of Manaar (BM (NH) 87.10.27.12: E. Thurston, one; BM (NH) 1953.3.10.209–210: R. Winckworth, v/1934, one adult, two juveniles); Krusadai Island, Gulf of Manaar (BM (NH) 1953.3.10.209–210: R. Winckworth, iii/34, two); Pamban, Gulf of Manaar, dredged (A. Jenner colln., two); Cape Comorin (BM(NH) 1953.3.10.125: R. Winckworth, iv/31, one). SRI LANKA (BM(NH) 75.4.8.52: E. W. Holdsworth, one).
Locality erroneous or lacking: 'Red Sea' (MM: Darbishire, two; IRSN: Dautzenberg, one; ANSP 111826: J. Ford; BM(NH): J. Lombe-Taylor, one (Reeve, 1864, pl. 7, fig. 19c) and H. Cuming, seven). 'Aden' (RSM: Salisbury, one). 'Persian Gulf' (NM H670: H. Becker, one; BM(NH): De Burgh, two). 'Zanzibar' (RNHL: J. Mulder, four). 'Java' (RNHL: G. C. Reinwardt, one). 'Madoera' [= Madura Is, Indonesia] (RNHL: J. Betrem, 1929, one). 'Loc?' (RSM: Bell-Pettigrew, one, Salisbury, two; NMV.: four, as '*Ancillaria aequivoca*' M/S).

Literature records: INDIA: Pamban and Krusadai Island (Satyamurti, 1952); Madras (Gravely, 1942); Tranquebar (Chemnitz).
Erroneous (selected records only): Dar es Salaam, Tanzania (Spry, 1968 = *Ancilla ventricosa*); Great Bitter Lake, Suez Canal (Barash & Danin, 1972 = *A. castanea*); 'China Seas' (Sowerby, 1830, for *A. effusa*); Port Elizabeth, South Africa (Sowerby, 1892 = *A. albozonata*).

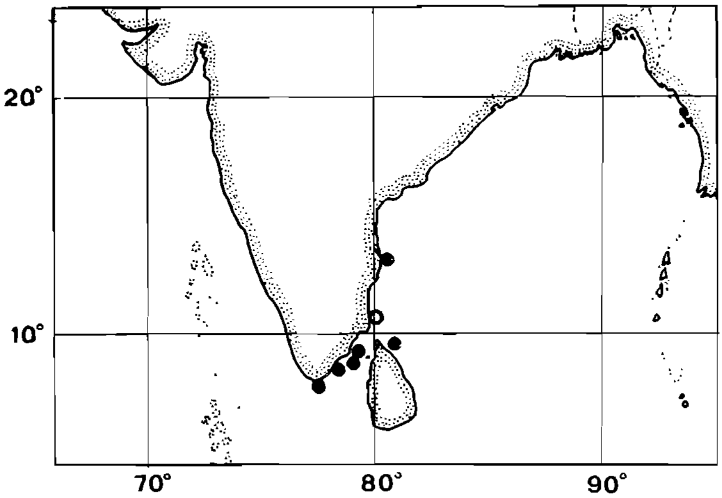


Fig. 40. *A. cinnamomea*, distribution. Circle indicates literature record.

Fossil records: Pliocene of Karikal, south-eastern India (Cossmann, 1903); Miocene & Pliocene of Tji Lanang and Sonde, Java (Martin, 1895); Pliocene of Atjeh, Sumatra (Martin, 1928). This material requires further study. Cossmann's figures certainly appear to show *A. cinnamomea*, save that the columella pillar is markedly narrower than in Recent shells. Martin's figures show a broad columella, but in shape appear to be distinctly narrower overall than are Recent examples. It is possible that these differences reflect the derivation of *cinnamomea* from *ampla*-type ancestors.

Habitat: Burrow shallowly in sand at low tide; average sea temperature within range 25°–30° C, salinity 32‰–36‰, falling as low as 25‰ in winter.

Type material: The type figures of *A. cinnamomea* (Lamarck, 1816, pl. 393, figs 8a, b) are inaccurate but diagnostic. A Lamarck specimen (Fig. 39), here regarded as the holotype, is preserved in the MHNG (No. 1354/52). Type locality unknown, here designated as Tranquebar, India (after Chemnitz).

The types of *Ancillaria effusa*, *A. albifasciata* and *Porphyria staphylea* are lost. Types of *Ancilla coccinea* may be amongst the remnants of the Demidoff collection held by the Moscow University Museum.

Taxonomy: Although *Porphyria staphylea* Röding, 1798, has several years priority over *Ancilla cinnamomea* Lamarck, 1801, the latter name has now been placed (as no. 1696) on the Official List of Specific Names in Zoology (ICZN Opinion 579). The original figure-citation given by Lamarck (Martini, 1773: pl. 65, fig. 731) actually portrays a juvenile *Cypraea*. Lamarck later (1822) transferred this citation to his *Ancillaria ventricosa*, substituting Chemnitz, 1788: pl. 147, fig. 1381, which is a fair representation of *A. cinnamomea*. In 1816 he figured his species (*loc. cit.*); although several subsequent writers were critical of the latter figures, they unmistakably represent the *Ancilla cinnamomea* of authors. Swainson (1825), perhaps the first writer to attempt recognition of *A. cinnamomea*, placed undue importance on the colour of the columella, described by Lamarck as 'rufo', but shown by Chemnitz as white, and concluded that Lamarck 'has incorrectly described the shell figured by Martini [ie. Chemnitz] (f. 1381)'! The species misidentified by Swainson as *A. cinnamomea* was later renamed *A. albisulcata* by Sowerby. The true *cinnamomea* appears to have been erroneously redescribed as *Ancillaria effusa* by Swainson. *A. albifasciata* Swainson would appear to have been based on a mixture of species, the buff-yellow coloration and the presence of elevated growth-striae in 'old specimens' pertaining to *A. albisulcata*, whereas the white band at the 'base of the spire', the absence of a white basal line and the shorter, thicker and more oblique columellar pillar apply better to *A. cinnamomea*. Authors of the previous century tended to regard it as a pale form of *cinnamomea* with a white columella, a view that I accept. Deshayes (1844), in his revised edition of Lamarck's 'Hist. Nat.', accepted Chemnitz's fig. 1381 as representing *A. cinnamomea*. Kiener's figure of the latter was unfortunately not based on a specimen from the Lamarck collection, but resembles the holotype, although the columella pillar seems somewhat narrow, approaching that of *A. djiboutina*.

Bulla cypraea Linné, 1758, was shown by Dodge (1955: 46) to be based on an indeterminate juvenile *Cypraea*. *Ancilla brunea* (emended to '*brunnea*' by subsequent authors) was evidently intended as a renaming (for unstated reasons) of *A. cinnamomea*. However, it was accompanied by neither a figure, description nor a reference but merely a comment on the possible application of Chemnitz's pl. 147, fig. 1381, to *A. cinnamomea*, and could well be regarded as a *nomen nudum*. Fortunately the question is now purely academic.

Ancilla coccinea Fischer von Waldheim, 1807, is a senior primary homonym of *Ancilla* [= *Amalda*] *coccinea* Hedley, 1914, from South Australia.

Notes: *Ancilla cinnamomea* is poorly represented in collections, and is seldom accompanied by accurate locality data. Available information indicates it to be endemic to the east coast of India, although material from old collections is generally labelled 'Red Sea' or 'Persian Gulf'. No preserved examples are available.

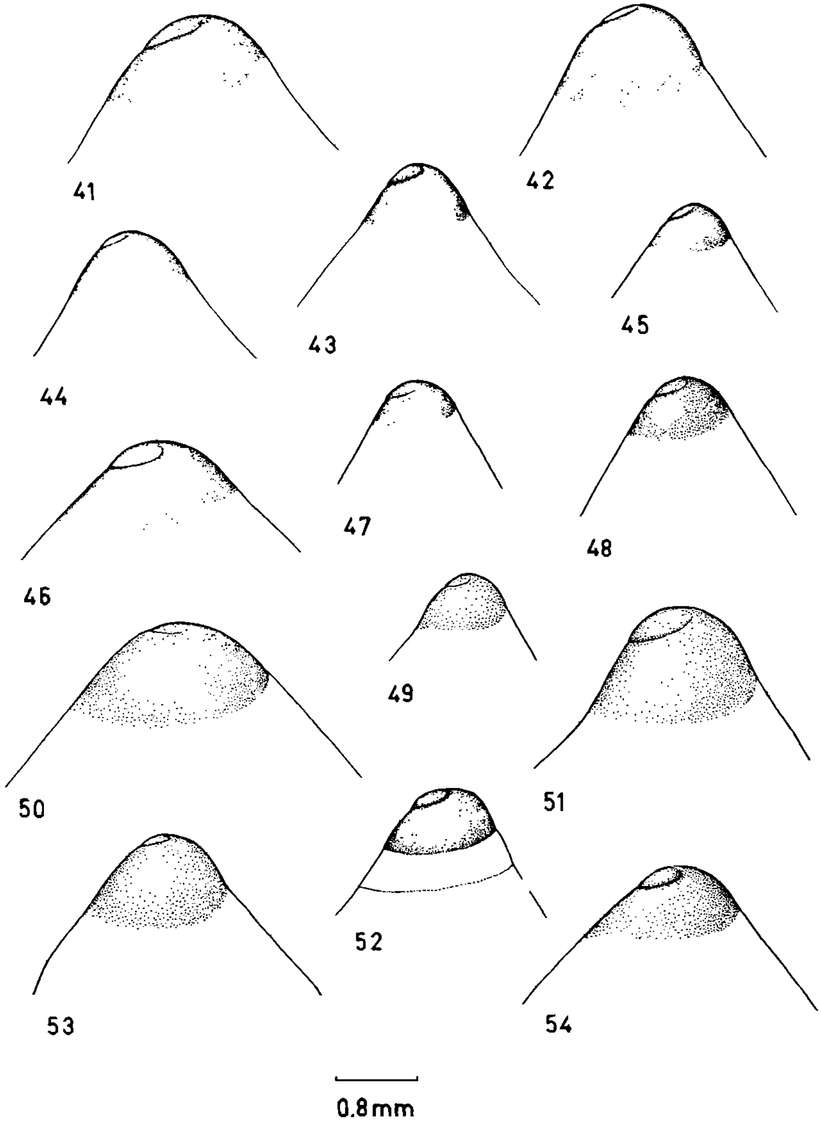
The name *cinnamomea* has been misapplied to a host of sometimes unrelated species (see above). *A. cinnamomea* is easily recognised by the broad white subsutural band and the fine white line which fills the ancillid groove, as well as by the finely lirate, strongly twisted and typically brown columella.

Ancilla (Sparellina) albisulcata (Sowerby, 1830)

Figs 29, 43, 71–74, 79, 80, 94–95.

Voluta caffra Forsskål, 1775 (*non* Linné, 1758): 33. Type locality: Red Sea.
Ancillaria albisulcata Sowerby, 1830: 4, figs 14–19; Kiener, 1844: 27, pl. 6, fig. 2; Sowerby, 1859: 59, pl. 212, figs 39–41; Reeve, 1864: pl. 7, fig. 22; Weinkauff, 1878: 12, pl. 4, figs 5, 6 (not '3, 4' as per text); E. A. Smith, 1891: 411; Shopland, 1902: 173. Type locality: 'In Oceano Indico'.
Sparella albisulcata; Gray, 1865: 37.
Ancilla albisulcata; Troschel, 1869: 112, pl. 10, fig. 61 (radula); M. Smith, 1912: 77.
Ancillaria achatina Kiener, 1844: 19, pl. 3, fig. 4. Type locality unknown.
Ancillaria cinnamomea (*non* Lamarck); Swainson, 1825: 277.
Not: *Ancilla albisulcata*; Dautzenberg, 1932: 26.

Diagnosis: Shell thick-lipped, with a sequence of growth plicules behind labrum, body whorl oblong, width 0,46–0,55 of length, aperture 0,66–0,83 of total length, spire low to moderately high (angle 70°–120°), apex papilliform to mamilliform,


41
42
43
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45
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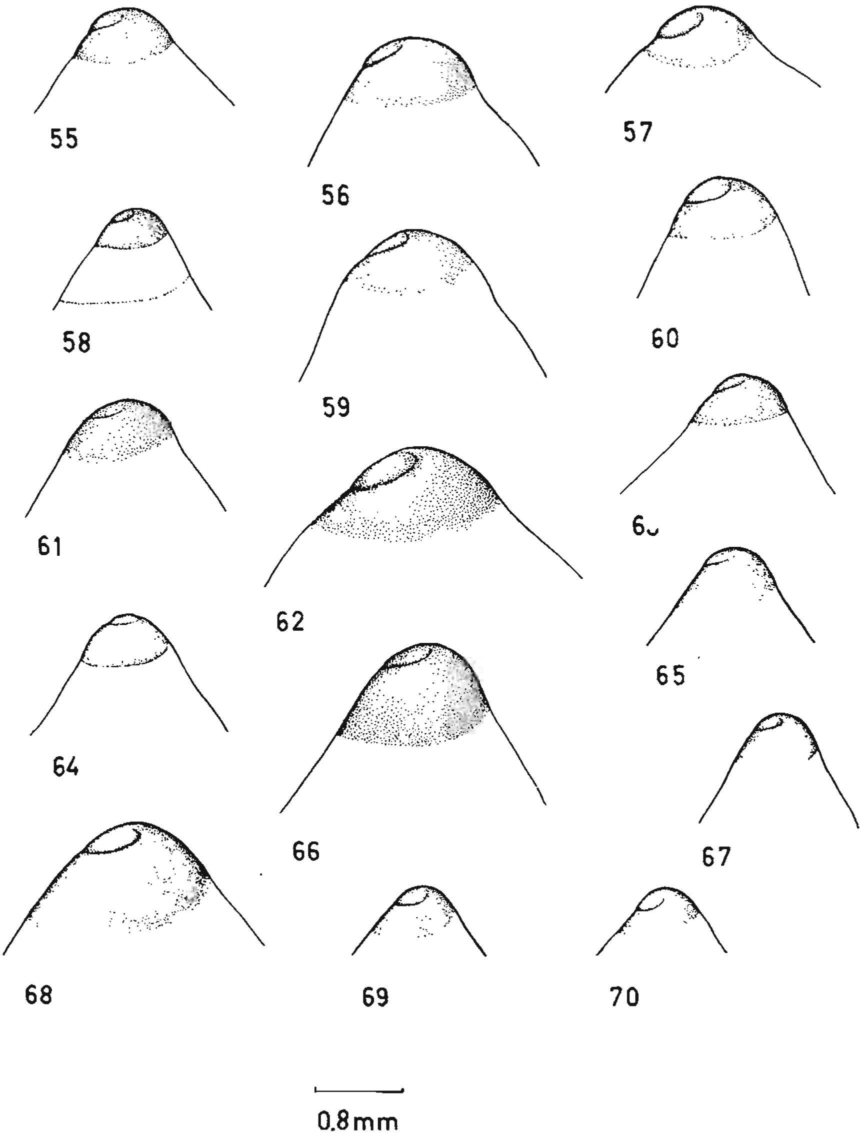
51
52
53
54
0.8 mm

Figs 41–54. Protoconchs of *Ancilla* species. 41, *A. cinnamomea*; 42, *A. boschi*; 43, *A. albisulcata*; 44, *A. djiboutina*; 45, *A. inornata*; 46, *A. tronsoni*; 47, *A. lineolata*; 48, *A. eburnea*; 49, *A. farsiana*; 50, *A. rouillardi*; 51, *A. chrysoma*; 52. *A. ampla*; 53, *A. taylori*; 54, *A. scaphella*.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56
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68
69
70
0.8mm

Figs 55–70. Protoconchs of *Ancilla* species. 55, *A. fasciata*; 56, *A. albozonata*; 57, *A. marmorata*; 58, *A. thomassini*; 59, *A. castanea*; 60, *A. sticta*; 61, *A. sarda*; 62, *A. v. ventricosa*; 63, *A. ovalis*; 64, *A. matthewsi*; 65, *A. testudae*; 66, *A. adelphe*; 67, *A. iota*; 68, *A. murrayi*; 69, *A. minima*; 70, *A. exigua exigua*.

right side of spire usually with a deep brown callus; ancillid band declivous; columella pillar long, oblique and convex posteriorly only, with 7–11 lirae of which the outer pair are separated from the rest; no parietal scar. Brownish-orange, rarely yellowish-brown or white, with a thin white line in the ancillid groove and an indistinct subsutural one. Maximum length about 40 mm.

Description:

Quantitative (N = 83):

Breadth/length: 0,46–0,55 (M = 0,49; SD = 0,02)
Aperture/total length: 0,66–0,83 (M = 0,73; SD = 0,03)
Spire angle: 70°–120° (M = 82,8°; SD = 8,7°)
Maximum dimensions: 40,4 × 19,7 mm
Minimum adult dimensions: 17,4 × 8,6 mm

Shell oblong-ovate, sometimes weakly ovate-biconical, periphery evenly rounded, posterior to middle, base with gently convex sides; spire low to relatively high, usually cyrtoconic, sometimes weakly coeloconic, moderately to heavily calloused, particularly on right side or at termination of penultimate whorl where there may be a thick or even massive callus pad; sutures not impressed; apex papilliform or (in heavily calloused examples) mamilliform; aperture as in *cinnamomea*, but less acute posteriorly and slightly more oblique basally. Surface smooth, except (in adults) for a series of coarse, pliculate growth-lines behind labrum; these may occasionally occupy most of terminal half of body whorl, and in gerontic examples may cross the callus deposit onto the spire; microshagreen sculpture as in *cinnamomea*. Ancillid band approximately 0,24–0,40 width of fasciolar band at labium, moderately declivous; ancillid groove and fasciole as in *cinnamomea*. Columella pillar oblique, long and fairly narrow, its inner edge convex posteriorly, straightening in front, with a deep basal sinus; surface with 7–11 thin, oblique lirae, of which the outer two are separated from the rest by an interval. Paries gently curved, without a ridge or internal 'scar'. Labrum thickened, its basal end forming a weak projection, which may be slightly crenulated.

Teleoconch whorls about three in number. Protoconch (Fig. 43) smaller and more narrowly domed than in *A. cinnamomea*; maximum diameter 0,8–1,1 mm.

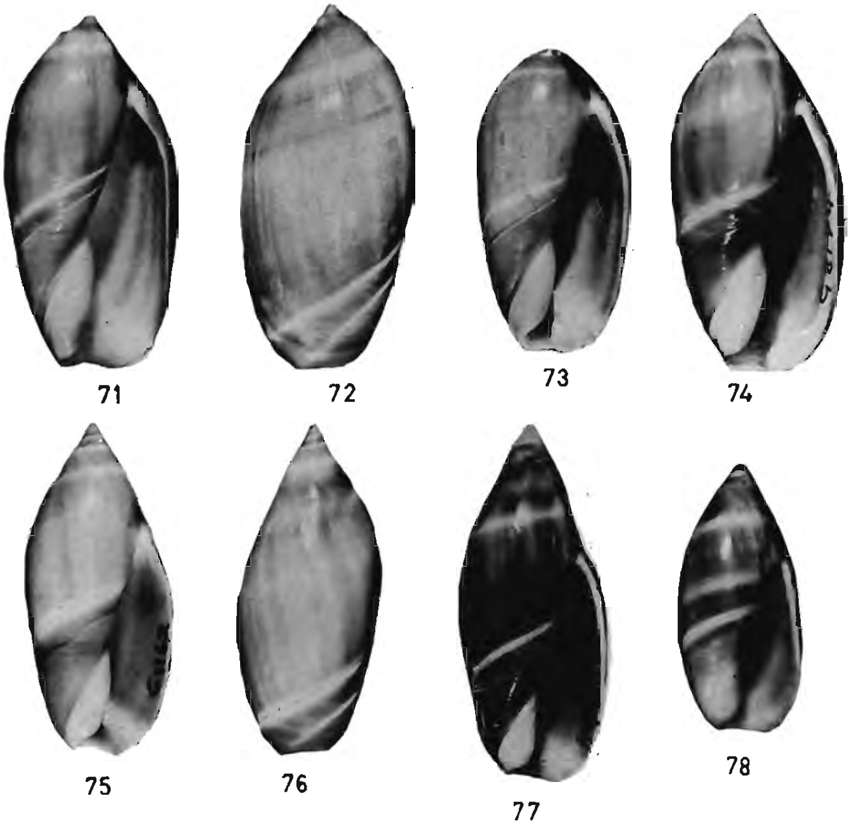
Coloration typically light orange-yellow or light yellowish brown, rarely light brown, darkening behind labrum to moderate orange-yellow, basal callus and deposit at termination of penultimate whorl darker (strong brown or strong orange-yellow); ancillid groove encompassed by a somewhat diffuse white line, extending more or less symmetrically on either side; a second, very diffuse and often faint, whitish band is situated just below suture; columella pillar white, usually tinged basally with orange; aperture brownish-orange, paler at base. Pure white specimens occur.

Juveniles resemble those of *A. acuminata*, but are darker in coloration, with a thicker shell and smaller columella pillar.

Operculum unknown.

Radula (fidé Troschel): similar to *A. acuminata*; rachidian with 5–6 intermediary cusps on either side of median cusp; 92 rows.

Distribution (Fig. 79): Northern Gulf of Aden and mainland of southern Red Sea.



Figs 71–78. *Ancilla albisulcata* (Sowerby, 1830), *A. acuminata* (Sowerby, 1859) and *A. boschi* Kilburn, 1980. 71–74, *A. albisulcata*. 71, 72, Neotype, NM J439, 40,4 × 19,8 mm; 73, Obtuse-spired example, Aden, NM G2682, 30,2 × 15,9 mm; 74, Narrow form, Aden, NM G8194, 28,4 × 13,9 mm. 75–76, *A. acuminata*, Dahlak Island, NM G1162, 28,1 × 12,1 mm. 77–78, *A. boschi*: 77, Holotype, NM G4507, 28,7 × 12,7 mm; 78, Paratype, Masirah Island, NM G1162, 18,3 × 8,5 mm.

Material examined: ETHIOPIA: Assab (HUJ: Coen, 1959, four immature). YEMEN: Al Hudaydah (USNM T16289: R. Kuntz, five); Mocha (A. Jenner colln, three, worn). SOUTH YEMEN: Aden (NM G2682: H. Burnup, two; J439: H. Burnup, one; NM G8194: L. Moore, three; IRSN: E. Boubée, three; MHNP: Jousseaume, 1921, six; USNM 306004: Bendall, one; NMV: Gerstenbrandt, two; RSM: Salisbury, eleven; MM: Stratton, two; BM(NH) 85.8.9.145–147: A. W. Baynham, three; BM(NH) 47.10.8.28–29: T. H. Russel and R. Watson, two; BM (NH) 1902.10.10.40–41: H. C. Dinshaw, two; BM(NH): H. Biggs, leg. Lander, 1963, two; HUJ.: Sowerby & Fulton, two); Aden harbour (RNHL: Strengers & L. E. Nobel, 1930, seventeen); Slave Island and Bandar Tawahi, Aden (P. Cambridge colln, three); Bandar Sheik, Little Aden (BM(NH): H. Biggs coll., five immature); Mandinat ash-Sha'b, west of Aden (AMS C83683: J. Phillips, 1969, one); Perim Island (NM G5083: one; BM(NH): P. Cambridge, one; MHNP: Jousseaume, three; BM(NH) 91.1.31.120: J. J. Walker, one juvenile).

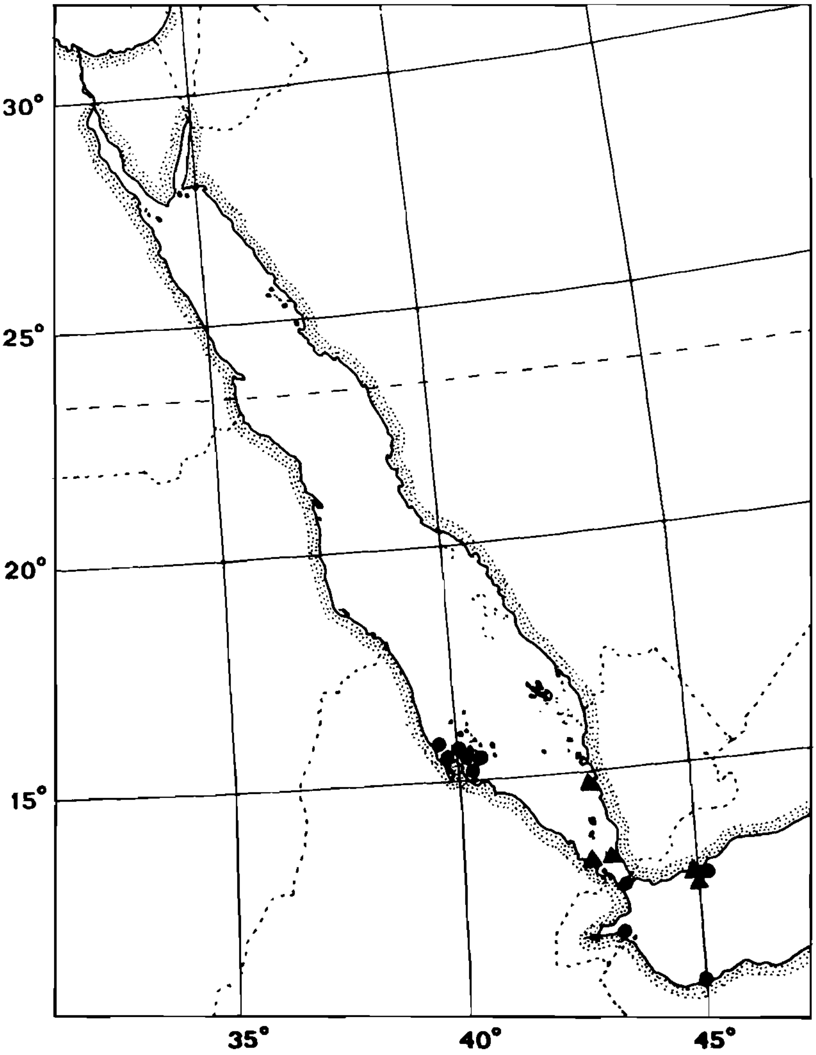


Fig. 79. *Ancilla albisulcata* (▲) *and A. acuminata* (●), distributions.

Doubtful records: 'Persian Gulf' (RNHL: Warnsinck, one; MM, one). Iran, 26°30'N, 54°30'E, 10 fathoms (BM(NH): F. W. Townsend, one).

Unlocalised or erroneous records: Loc? (RSM: Yerbury, probably Aden, seven). 'Red Sea' (AMS C52374, two; ANSP 111826: J. Ford, one; ANSP 66173, two; ANSP 29553: R. Swift, two; RNHL: J. Mulder, one; RNHL: Ruyssenaers, six; IRSN: Jousseaume, three). 'Andamans' (RSM, two). Cap St Marie, Madagascar (Dautzenberg, 1932, based on a broken, worn shell of unknown identity, IRSN colln.).

Type material: The types of *Ancillaria albisulcata* and *A. achatina* are lost. In order to fix the identity of the taxon, a neotype of *albisulcata* (NM J439/T2461: H.

Burnup, dimensions 40,4 ×19,8 mm) is here designated (Figs 71, 72). The type locality is emended from 'Indian Ocean' to Aden, that of the neotype.

Two sets of specimens are labelled as *Voluta* or *Ancillaria caffra* in the Copenhagen Zoological Museum collection. One lot of three shells bears the label 'Fo[r]sk. Mare rubr. Steenstrup legit Forskål;' the specimens, however, are the Indian-Aden *Ancilla ampla*, which could not have been collected by Forsskål. The second set, of eight shells, is evidently genuine Forsskål material; of these specimens, one is a very worn *Ancilla ovalis*, a second white juvenile shell is probably *A. acuminata*, while the remainder are *A. albisulcata*. Of the latter, only one could be called 'flavicans', and this specimen, which measures 26,7 × 12 mm, is here designated as lectotype (Figs 94, 95). This shell is discussed below. This material was presumably collected by Forsskål on the Arabian coast between Jidda and Mocha, during the last phase of his disastrous expedition.

Habitat: Unrecorded. Temperatures within its known range are approximately 25°–32° C, salinity range 36,5‰–39,2‰. Forsskål (1776: pl. 40, fig. F, as 'Volutae species') gave an outline sketch of a living specimen, which suggests that *A. albisulcata* may live intertidally.

Taxonomy: In old collections this species frequently appears as *Ancillaria albifasciata* Swainson, 1825. As explained under *Ancilla cinnamomea*, Swainson's description combines elements pertaining to both species. However, most points seem to apply to *A. cinnamomea*, and as the type material is evidently lost there is no possibility of pin-pointing the identity of the nomen by selective lectotype designation. In the interests of stability one must resort to the later *Ancillaria albisulcata*, about whose identity there is no doubt.

Although *Ancilla acuminata* and *A. albisulcata* are normally readily separable on shape and coloration, some individuals of both species (see Fig. 80) may approach one another in proportions. Furthermore, out of a total of 155 adults of

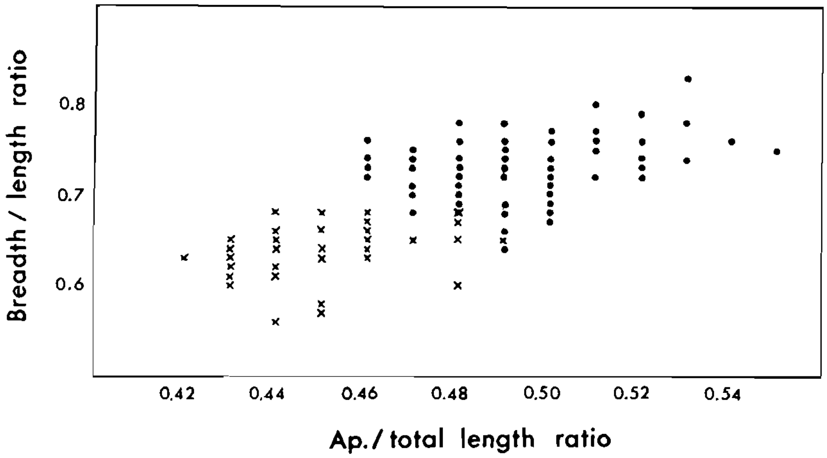


Fig. 80. *Ancilla albisulcata* (●) and *A. acuminata* (×), scatter-diagram, showing intergrading proportions, breadth/length ratio plotted against aperture/total length. N = 66 and 59 respectively.

both taxa, 11 (ie. 7,1%) show an intermediate combination of characters, and in extreme cases can be referred with equal uncertainty to either species. *Voluta caffra* Forsskål, 1775, and *Ancillaria achatina* Kiener, 1844, were based on such intermediates. Fortunately, such a low incidence of presumed hybrids is unlikely to affect the genetic constitutions of the 'parent' taxa, and their specific distinctness does not appear to be in doubt. The present distribution patterns of *Ancilla acuminata* and *albisulcata* suggests that the two may have evolved parapatrically or allopatrically as sister-groups on either side of the Bab-el-Mandab Straits, which during periods of eustatic or isostatic lowering of the sea-level would have acted as a dispersal barrier or filter-route. Secondary hybridisation has probably followed the subsequent invasion of the Gulf of Aden by *A. acuminata*. Within the Red Sea itself, *A. acuminata* is characteristic of the Dahlak Archipelago and vicinity, whereas *A. albisulcata* is largely a mainland species, which has barely penetrated up the Ethiopian and Yemen coasts. This may explain the scarcity of intermediate individuals from the region. Curiously, most such *acuminata* × *albisulcata* intermediates are known from localities within the Gulf of Aden where typical *acuminata* appears to be uncommon or even rare. An exception is the lectotype of *Voluta caffra* which was probably taken on the Yemen coast; this specimen is closer phenetically to *albisulcata* than to *acuminata*, and the taxon is accordingly placed in the synonymy of the former species.

Notes: Reports of this species from the Persian Gulf (eg. Melvill & Standen, 1901: 427, and Melvill, 1928: 110) are largely based on specimens of *Ancilla castanea*. The only genuine *albisulcata* with precise Persian Gulf locality data examined by me was supposedly dredged by Townsend off Iran (see above). Confirmation of this record is required.

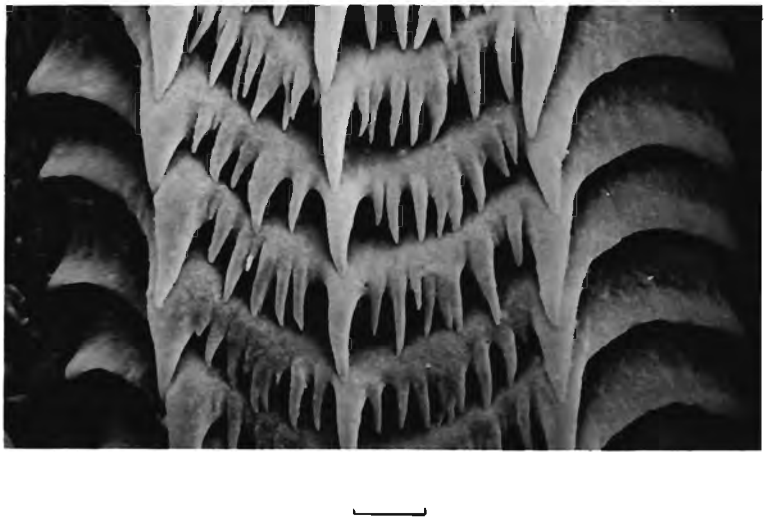


Fig. 81. *Ancilla acuminata*, SEM photograph of air-dried rachidian. Scale line = 0,01 mm.

Ancilla (Sparellina) acuminata (Sowerby, 1859)

Figs 7, 19, 30, 74–75, 79–81, 127

Ancillaria acuminata Sowerby, 1859: 59, pl. 214, figs 66, 67; Reeve, 1864: pl. 7, fig. 21; Weinkauff, 1878: 14, pl. 4, figs 7, 8; E. A. Smith, 1891: 411; Shopland, 1902: 173; Sturany, 1905: 142. Type locality: 'South Africa'.
Ancilla acuminata: H. Fischer, 1901: 98; M. Smith, 1912: 77.
? *Ancilla acuminata*; Satyamurti, 1952: 193.
? *Ancilla caffra*; Troschel, 1869: 111, pl. 10, fig. 15 (radula).

Diagnosis: Shell oblong-biconical, breadth/length 0,42–0,49, spire high and orthoconic, angle 55°–72°, sutures not impressed, periphery posteriorly situated, rest of body whorl slightly conical and almost flat-sided; aperture 0,56–0,68 of total length, distinctly oblique basally; columella pillar fairly thick and convex, with 6–9 ridges, the outer pair separated by a stronger furrow from the rest; inside of paries with a sunken 'scar'; labrum rather thin, not preceded by pliculate growth lines. Colour pale yellowish-brown, basal callus reddish-brown, ancillid groove and subsutural region each with a white line. Maximum length about 35 mm.

Description:
Quantitative (N = 59):
Breadth/length: 0,42–0,49 (M = 0,45; SD = 0,02)
Aperture/total length: 0,56–0,68 (M = 0,64; SD = 0,03)
Spire angle: 55°–72° (M = 63°; SD = 4,3°)
Maximum dimensions: 35,4 × 15,2 mm
Minimum adult dimensions: 16,7 × 7,4 mm

Shell oblong-biconical with a high, acutely orthoconic spire, body whorl usually with traces of a rounded shoulder, below which it gradually tapers, with barely convex sides; aperture shape as in *A. cinnamomea*, but usually more acute posteriorly, and the base is markedly more oblique, while the columella meets the paries at less of an angle; spire evenly calloused, sutures not impressed, apex slightly papilliform. Surface smooth except for very faint growth-lines, somewhat arcuate across sutures, somewhat stronger (but never pliculate) behind labrum and across fasciolar band; also distinct microshagreened sculpture on columella pillar and in anterior fasciolar groove, becoming indistinct on fasciole, paries and labrum. Ancillid band declivous, about 0,30–0,40 width of fasciole at labium, ancillid groove ending in a small, blunt denticle, fasciolar band flattened or gently convex; columella pillar strongly oblique, with 6–9 thin spiral threads, the outer two separated from the rest by a broader groove, columella lip subequal in length to paries, strongly convex but shallowly and obliquely notched anteriorly. Paries almost straight with a weak longitudinal ridge, parallel to aperture, bordered internally by a scar-like concavity; labrum rather thin, slightly incurved, its edge weakly prosocline.

Colour greyish-yellowish-brown to light yellowish-brown, sometimes with diffuse, darker axial streaks, fasciolar band and most of ancillid band darker (light brown of ISCC-NBS), ancillid groove covered by a white line which extends equally on either side; sutures bordered below by a second white line; columella pillar white, aperture light brown with a diffuse white band basally (corresponding to site of ancillid band). Entire shell rarely uniform white or yellowish-white.

Teleoconch whorls about four. Protoconch as in *A. albisulcata*.

Operculum: Not seen.

Radula (Figs 19, 81, 127) with about 72 rows of teeth: rachidian plate pectinate, median cusps slightly longer than side cusps but more slender, intermediary denticles slender, irregular, generally 6 per side, sometimes 5 or 7; lateral plate with a broad base (nearly as long as uncinus).

Distribution (Fig. 79): Southern Red Sea and Gulf of Aden.

Material examined: ETHIOPIA: (a) Dahlak Archipelago: Dahlak Island (NM G2687: D. Peled, 1973, ten; NM G1162: D. Peled, 1971, one; NM G8238: M. Ostini, 1975, three, in 2 metres; NM G7903: D. Peled, 1974, three; G9014: D. Peled, 1975, seven, in 2–8 metres); near Dissei Island, 1 metre on sand (NM G2690: M. Ostini, 1974, one immature); Hatitou, littoral (TAU: ISRSE, 1965, one); Enteddir Island, beach (TAU, 1962, two); Museri Island, 0–0,5 m (TAU: ISRSE, 1965, one); (b) Eritrean mainland: Massawa (NMV 15684: Jickeli, one; USNM 708929: U. D. Blamkenship, two); Hawakil (Hauachil) Bay, 10–12 fathoms and 5–6½ fathoms (TAU: ISRSE, 1965, eighteen and one respectively, mainly juveniles). GULF OF ADEN (most showing some indication of hybridisation with *A. albisulcata*) (NM G5084: W. Falcon): Aden (MHNP: Jousseaume, 1921, four; RNHL: J. Mulder, one; BM(NH) 88.4.9.148–9: Yerbury, two); Djibouti (MHNP: C. Gravier); Berbera (NM H9677: W. Falcon); Perim (Barim) Island (P. Cambridge colln., one).

Unlocalised or erroneous records: 'Red Sea' (BM(NH): De Burgh, three; MHNP: Letellier, 1949, two; RNHL: Ruyssenaers, twenty). 'Zanzibar' (BM(NH): H. Cuming, three; RNHL: J. Mulder, one; RSM: Salisbury, thirteen; NM H9661: H. Becker, ex Sowerby, one). 'Persian Gulf' (RNHL: Warnsinck, two).

Fossil records: Pliocene of Zifaf Is., Farasan Is., Saudi Arabia, Red Sea (BM(NH) Geol. Dept. G474156: two).

Literature records: INDIA: Pamban, and CEYLON (Satyamurti, 1952, probably based on *A. boschi*). SOMALIA: Berbera (Sturany, 1905). RED SEA: Suez (Weinkauff, 1878, erroneous).

Habitat: Burrowing in sand, from low tide to 22 metres; evidently inhabits waters with salinities of 37,4–38,7‰ and temperatures within the 24°–33° C range.

Type material: Three possible syntypes, BM(NH) 197935. The type locality is here amended to Massawa, Ethiopia.

Taxonomy: Few workers have experienced difficulty in identifying this species, although in the Indian/Persian Gulf subregion it would appear to have been confused with *Ancilla boschi* Kilburn, 1980, an essentially similar species with a very different columella pillar. *A. acuminata* is normally easily separable from *A. albisulcata* Sowerby, 1859, which typically differs in shape, in its narrower, more finely lirate columella, its pliculate growth-lines and its diffuse white bands, and in lacking a concave 'scar' on the inner side of the paries. However, as indicated above, most specimens of *acuminata* from the Gulf of Aden show traces of *albisulcata*-like characters, which may even be so strongly expressed as to render the identity of an individual debatable (Fig. 80). One specimen from Berbera is fairly typical for *acuminata* but is uniform brownish-pink in colour, without trace of white bands.

General: Although much of the *A. acuminata* material distributed by early dealers bore the locality 'Zanzibar', this has never been confirmed from a reliable source. However, a chalky, badly eroded shell from Dar es Salaam, collected by the British Museum East African Expedition of 1924 (BM(NH) 1933.1.5.233), could possibly prove to be this species.

A series of specimens with soft parts, preserved in the ZMC, bear the label '*Ancillaria caffra* Forsk. M. rubr., legit Polack, 1864', and may well be the original source of the radula which was figured by Troschel (1869: pl. 10, fig. 15) under this name. The S.E.M. photographs reproduced here are derived from this material.

Ancilla (Sparella) boschi Kilburn, 1980

Figs 32, 42, 76–77, 82–83

Ancilla boschi Kilburn, 1980: 167, fig. 1. Type locality: Masirah Island, Oman.

Remarks: This recently described species is closest to *A. acuminata* in general features but differs, *inter alia* (see original description), in its short, straight columella, which bears only 2–3 lirae. In this structure and in its very shallow siphonal notch, almost flush ancillid band and smooth paries it shows a slight resemblance to *A. djiboutina*. From that species it differs in its more biconical shape, more oblique base, less extensive microshagreen sculpture, more anteriorly-situated white band, and a more conspicuous white line in the ancillid groove, while there is no brown callus above the suture.

An aberrant paratype from Masirah Island (NM G4508/T244: D. Bosch) is here figured (Fig. 77). This shows an intermediary white band at the level of the hind end of the aperture.

Three paratypes (NM G9275/T2415) received with dried soft parts, proved to have been mutilated by dermestids, but yielded radular information. The foot, in reconstituted state, was pale flesh-colour, flecked with brown; the tentacles appear to be longer than in any other *Ancilla* examined.

Radula (Fig. 83): Rachidians tricuspidate, median cusp slightly longer than side ones, intervals U-shaped, with 1–2 small, sharp intermediary denticles; lateral plates with a hooked uncinus, which is shorter than its base. Number of rows about 50.

Distribution: see map (Fig. 82).

Ancilla djiboutina (Jousseaume, 1894)

Figs 31, 44, 84–86, 93.

Ancillaria djiboutina Jousseaume, 1894: 104; Fischer-Piette & Beigbeder, 1944: 459. Type locality: Djibouti.

Ancilla djiboutiensis Dautzenberg, 1932: 26 (*nom. subst.*)

Diagnosis: Shell subcylindrical, greatest width median and 0,40–0,48 of length, spire sharply conical, angle 61°–76°, aperture 0,62–0,74 of total length; ancillid

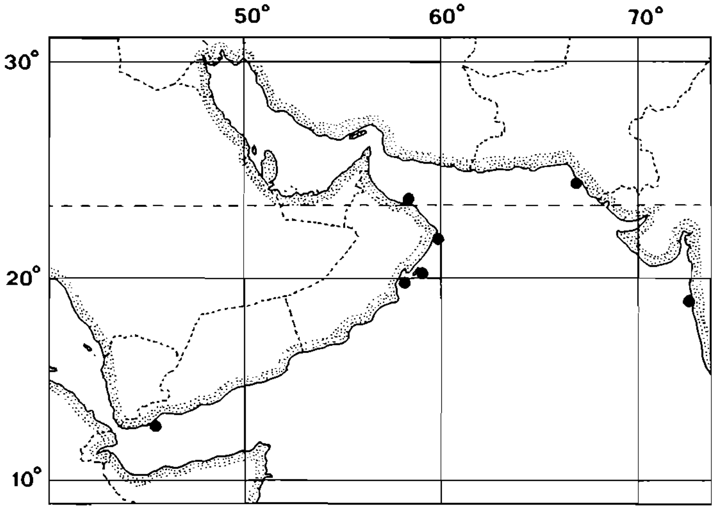


Fig. 82. *Ancilla boschi*, distribution.

band almost flush; microshagreen sculpture extending onto ancillid band; columella pillar narrow, rather straight, with 3–5 lirae, the outer one isolated, inner margin straight or weakly convex, base scarcely oblique. Yellowish-brown, darker basally and above suture, ancillid groove with a thin white line, while a conspicuous white band lies below suture. Maximum length 29 mm.

Description:

Quantitative (N = 46):

Breadth/length: 0,40–0,48 (M = 0,44; SD = 0,02)
Aperture/total length: 0,62–0,74 (M = 0,66; SD = 0,03)
Spire angle: 54°–75° (M = 64,4°; SD = 5,5°)
Maximum dimensions: 29,0 × 11,8 mm
Minimum adult dimensions: 12,8 × 5,2 mm

Shell subcylindrical, greatest width more or less median, body whorl very gently convex, subsutural region of body whorl slightly tumid, labrum inserted well down penultimate whorl, spire sharply conical, but of few whorls, ortho- to cyrtoconic, rarely coeloconic; aperture as in *A. acuminata*, but labium straighter, and base less oblique (ie. columella pillar is less foreshortened) and more shallowly notched. Spire slightly more heavily calloused than in *A. acuminata*, sutures only very slightly impressed, apex slightly papillose. Ancillid band almost flush, 0,22–0,39 of width of fasciolar band at labium; fasciolar band gently convex, with rather indistinct growth lines, anterior fasciolar groove relatively deep. Columella pillar rather narrow, subequal in length to paries, its labial edge usually straight, sometimes gently convex, with 3–5 lirae, of which the outermost is separated by a distinctly wider interval; basal sinus rather shallow. Paries with a rounded ridge evanescing posterior to ancillid groove. Labrum moderately thickened, slightly incurved, labral denticle well developed. Surface without distinct growth-lines, columella pillar, entire fasciolar band, ancillid band and outer labral edge finely but distinctly microshagreened.

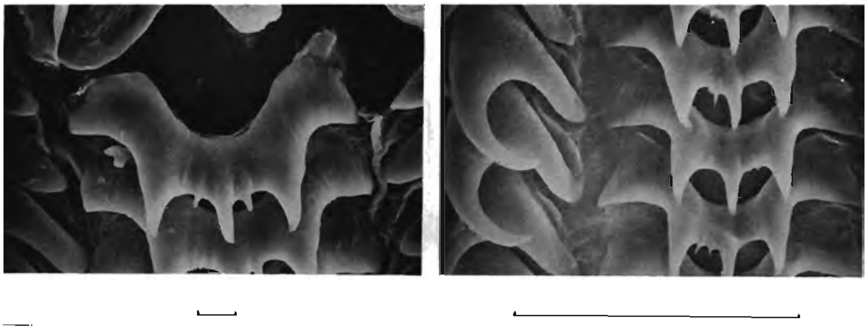


Fig. 83. *Ancilla boschi*, SEM photograph of air-dried radula, Masirah Island. Left, Rachidian plates, scale = 0,01 mm; Right, rachidians and laterals, scale = 0,1 mm.

Teleoconch whorls 3. Protoconch (Fig. 44) of about 1,5 whorls, broadly conical; basal diameter 1,2–1,3 mm.

Ground colour light yellowish-brown, often with darker axial streaks and vitreous axial hair-lines; basal and spire callus-deposits moderate brown, the latter deposit terminating in a conspicuous blotch at end of penultimate whorl; subsutural margin with a well-marked white band or line, ancillid groove with a faint white line which expands further anteriorly than posteriorly, aperture uniform light brown; columella pillar white. Shell rarely uniform white.

Operculum and radula unknown.

Distribution (Fig. 93): Gulf of Aden, east to the Gulf of Oman, and west to lower Egypt.

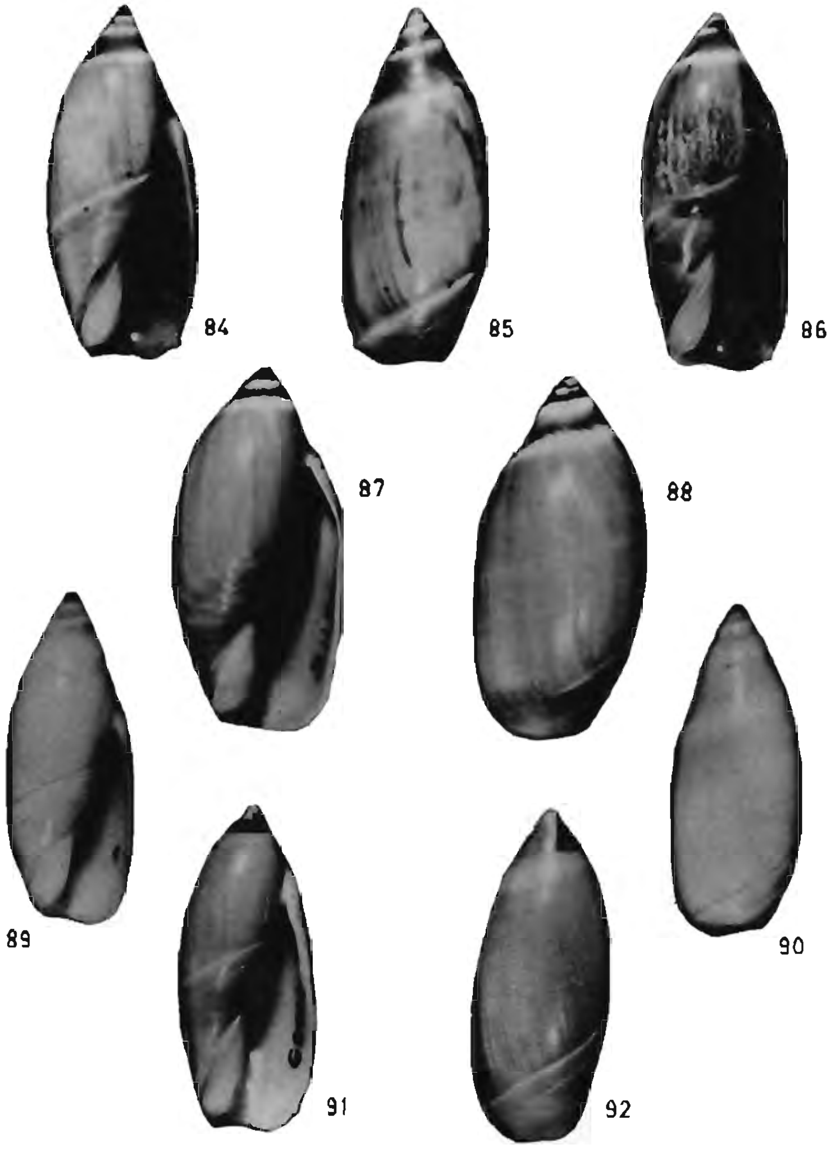
Material examined: DJIBOUTI: Djibouti (MHNP: Jousseaume, 10 syntypes; MHNP: C. Gravier, 1904, four; IRSNB: Cousin colln., ex. Jousseaume, one; IRSNB: G. Moazzo, 1929, two; NM H5746: J. Lavranos, 1978, four; A. Jenner colln.: J. Lavranos, seven); Dorale, 10 km west of Djibouti (NM G2231: J. Lavranos, 1973, two). SOMALIA: Zeila (IRSNB: G. Moazzo, 1929, two). SOUTH YEMEN: Aden (BM(NH) 1902.10.10.46–48: H. C. Dinshaw, three). SULTANATE OF OMAN: Muscat, 15 fathoms (BM(NH): F. W. Townsend). EGYPT: Al Ghardaqa (=Hurghada) (NMV: E. Stüber, one).

Unlocalised or erroneous records: Red Sea (RSM: Jouseaume, one; IRSNB: Bavay colln., ex Jousseaume, two); Gulf of Aden (USNM 608863, one); Persian Gulf (NMW: Melvill-Tomlin colln., two).

Type material: Ten syntypes from Djibouti in MHNP, Jousseaume colln., 1921. The lectotype (Figs 84, 85), which measures 26,4 × 11,2 mm, is here figured for the first time.

Habitat: All specimens seen—save for the Muscat example, which was dredged in 27 metres—appear to have been collected littorally.

Taxonomy: *Ancilla djiboutina*, which has never been figured, is unidentifiable from the original description, but the types are fortunately extant. The species is relatively constant in its characters, the only truly atypical individual being one from Al Ghardaqa, in which the columella and aperture are orange-tinted.



Figs 84–92. *Ancilla djiboutina* (Jousseaume, 1894), *A. rouillardi* sp. n., *A. inornata* (E. A. Smith, 1879) and *A. chrysoma* sp. n. 84–86, *A. djiboutina*: 84, 85, Lectotype, MHNP colln., 26,4 × 11,2 mm; 86, Djibouti, NM H576, 22,0 × 9,3 mm. 87, 88. *A. rouillardi*, holotype, NM B1101, 35,8 × 17,3 mm. 89, 90. *A. inornata*, Muscat, NM H9679, 14,9 × 5,8 mm. 91, 92. *A. chrysoma*, holotype, NM J441, 35,9 × 15,8 mm.

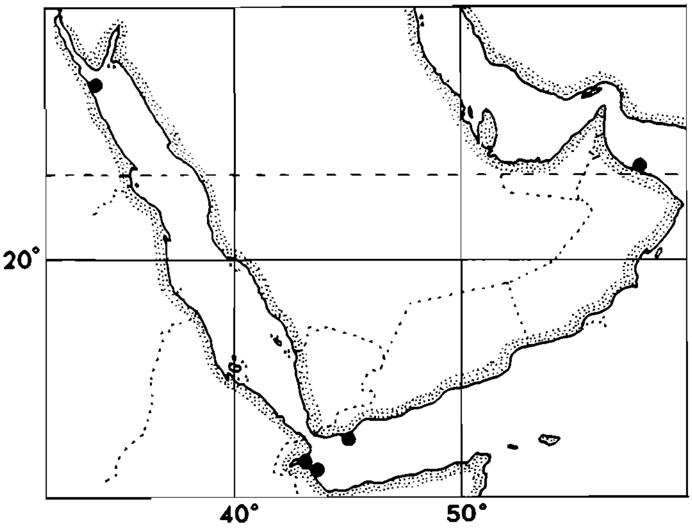


Fig. 93. *Ancilla djiboutina*, distribution.

Dautzenberg's substitute name *Ancilla djiboutiensis* is unnecessary. The Malagasy material (IRSN colln.), reported by Dautzenberg (1932: 26) under this name, consists of a mixture of species, including *Amalda depressa* from New Zealand, and none are referable to the true *djiboutina*.

Ancilla djiboutina can be confused with young examples of *A. acuminata*, from which it differs in its much narrower, paucilirate columella pillar, lower spire, extensively microshagreened fasciole and non-declivous ancillid band; also the white line which encompasses the ancillid groove is asymmetrical, extending further onto the ancillid band than onto the median zone; in *A. acuminata* this white line is symmetrical. There is also some resemblance to the Indian *A. cinnamomea*, which is, however, larger, broader and more vividly coloured, with a wider, more strongly twisted and multilirate columella pillar, which is generally tinged with brown, and a more declivous ancillid band.

Ancilla inornata (E. A. Smith, 1879)

Figs 33, 45, 89–90, 96–97

Ancillaria inornata E. A. Smith, 1879: 217, pl. 20, fig. 56. Type locality: 'Japan'.

Diagnosis: Shell narrow, width 0,39–0,41 of length, oblong-fusiform with high, acute spire (angle 42°–44°), aperture narrow, very acute behind, 0,54–0,59 of total length; columella pillar short, oblique, lip straight, lirae 3–4, outer one not separated, ancillid band flattened, wide; microshagreen sculpture extending onto ancillid band; uniform white. Maximum length about 15 mm.

Description:

Quantitative (N = 2):

Breadth/length: 0,39–0,41

Aperture/total length: 0,66–0,83

Spire angle: 42°–44°

Maximum dimensions: 14,9 ×5,8 mm
Minimum dimensions (holotype): 8,0 × 3,3 mm

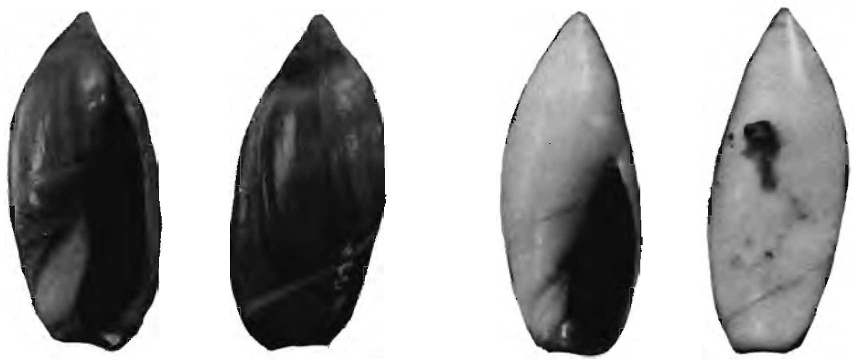
Shell oblong-fusiform; greatest width posterior to middle, spire high and acute; spire whorls sometimes slightly impressed at sutures, covered with an even callous glaze, exposing protoconch. Aperture narrow, acutely tapering posteriorly, greatest width median, parallel-sided anteriorly; base slightly oblique, siphonal canal wide, very shallowly and broadly notched. Surface smooth, except for very fine microshagreen sculpture, which extends over the fasciole and ancillid band as in *djiboutina*. Labrum thin, evenly-curved, posteriorly rather drooping, in side view almost straight and slightly prosocline. Columella pillar not strongly twisted, almost equal in length to paries, its lip straight, pleats 3–4, becoming progressively weaker, outermost pleat often bifid towards aperture. Paries without callus, its longitudinal ridge and scar feeble or absent; parietal/columella junction forming only a slight angle. Ancillid groove fairly deep, terminating in a small labral denticle; ancillid band flat and almost flush, 0,57–0,75 width of fasciolar band; anterior fasciolar groove fairly shallow, fasciolar band rather flat. Entire shell uniform white.

Protoconch (Fig. 45) narrowly domed, first whorl rather globose; about 1,5 whorls, maximum diameter 0,8–1,0 mm. Teleoconch whorls about 3,5.

Material examined (other than holotype); SULTANATE OF OMAN: Muscat (NM H9676: W. Falcon).

Type material: The holotype (Figs 96, 97) is a slightly immature specimen (BM 78.10.16.66), labelled 'Japan'. The type-locality is here emended to 'Muscat' (see below).

Taxonomy: Japanese workers, in an attempt to reconcile this species with their local fauna, have regarded it as a juvenile of '*Baryspira sinensis*' [=*Amalda montrouzieri*]. The holotype shows *inornata* to be an *Ancilla*, closely allied to



94 95 96 97

Figs 94–97. *Ancilla* species. 94, 95, *A. albisulcata*, lectotype of *Voluta caffra* Forsskål, 1775 (*non* Linné, 1758), ZMC colln., 26,7 × 12,0 mm. 96, 97, *A. inornata*, holotype, BM(NH) 78.10.16.66, 8,0 × 3,3 mm. Photographs courtesy of ZMC and BM(NH).

A. djiboutina, from which it differs in its smaller protoconch, shorter columella pillar, much higher, more acute spire and posteriorly narrower aperture. There is also some resemblance to narrow examples of *A. eburnea*; the latter, however, has a conspicuous parietal 'scar', a larger protoconch, and shows other differences. While speculation based on two specimens, only one localised, is fruitless, it is likely that *A. inornata* originated as a peripheral isolate of *A. djiboutina* in the Gulf of Arabia or adjacent waters.

General: *Ancillaria inornata* was described by E. A. Smith in a paper on Japanese material collected by a Captain H. C. St John and forwarded to him by J. Gwyn Jeffreys. Significantly, it is the only species in this paper (other than *Mangilia robusticostata*) with neither exact locality nor station number. One must conclude that these two were added, either by Smith or Jeffreys, from another source. *A. inornata* has not been rediscovered in Japan. The origin of the single localised specimen is uncertain, but it may have been obtained by Falcon from Tomlin or Townsend. However, it is curious that no specimens were present in the Townsend collection, now shared by the BM(NH), MM and NMW, and confirmation of its presence in Oman waters is required.

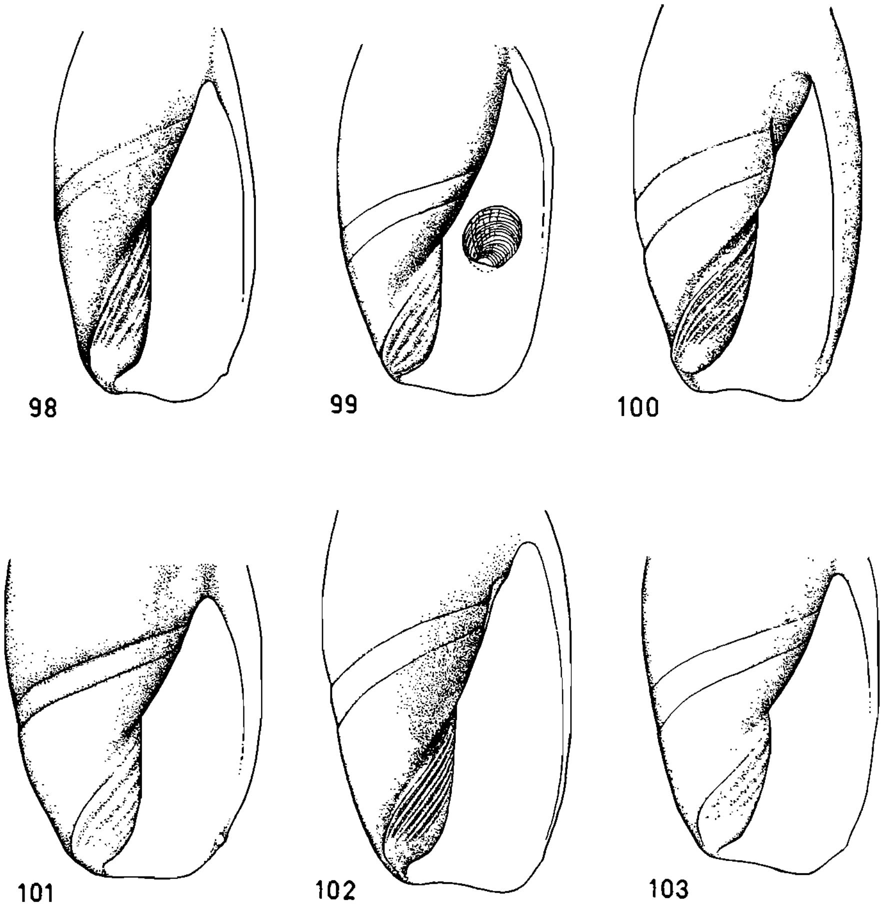
Ancilla (Sparella) rouillardi sp. n.

Figs 6, 50, 87–88, 99, 104–105

Diagnosis: Shell ovate-cylindrical, right side flatter than left, width/length 0,48–0,51, spire blunt, angle 67°–75°, aperture 0,72–0,75 of total length, base slightly oblique, siphonal canal not (or barely) notched; columella pillar oblique and relatively short, with four broadly rounded lirae, the outer one slightly separated; ancillid groove evanescing behind labrum, not forming a denticle; microshagreen sculpture extending onto ancillid band; pliculate growth-lines present behind labium and at suture; paries without callus ridge or 'scar'; light golden-brown, basal callus brownish-orange, suture deep reddish-brown, bordered below by a white band; maximum length about 36 mm.

Description:
Quantitative (N = 2):
Breadth/length: 0,48–0,51
Aperture/total length: 0,72–0,75
Spire angle: 67°–75°
Maximum dimensions: 35,8 × 17,3 mm
Minimum adult dimensions: 21,8 × 11,2 mm

Shell ovate-cylindrical, greatest width median, right side flatter than left and with vestiges of a shoulder; spire moderately raised, orthoconic, blunt, non-papillate, with flattened whorls, sutures hidden by callus. Aperture acute posteriorly, greatest width just anterior to middle, anterior end rather straight; siphonal canal wide and unnotched (or only slightly so), base slightly oblique. Surface smooth, save for a series of groove-like growth-lines which develop towards the termination of body whorl, and form distinct plicules on the sutural callus; microshagreen sculpture faint but extensive, covering ancillid and fasciolar bands as well as columella, paries and back of labrum. Ancillid band 0,35–0,42



Figs 98–103. *Ancilla* species, base of body whorl. 98, *A. chrysoma*; 99, *A. rouillardi*; 100, *A. farsiana*; 101, *A. eburnea*; 102, *A. tronsoni*; 103, *A. lineolata*.

width of fasciolar band (at labium), flattened and only very slightly declivous, ancillid groove very shallow, evanescing some distance before labral edge, without forming a denticle; fasciolar band flattened. Columella pillar oblique, rather cuneiform, relatively short (0,44–0,46 length of labium), its lip evenly convex, with a rather shallow basal sinus; columella lirae four, rather broadly rounded, outer one strongest and most widely-spaced. Paries evenly but strongly convex, without a callus, ridge or 'scar'. Labrum relatively thin, slightly incurved posteriorly, straight and prosocline in side-view.

Teleoconch whorls about three. Protoconch (Fig. 50) domed, whitish, composed of about 1,5 whorls, maximum diameter 2,6 mm.

Colour dark orange-yellow, with very fine, vitreous axial hair-lines, particularly on spire; ancillid and fasciolar bands darker to moderate orange; suture with a band of strong brown, bordered anteriorly by a white one; aperture light yellowish-brown, shading to white basally, siphonal canal with a white external margin, columella pillar white.

Operculum ovate with slightly pointed apex; translucent yellow, margin thin and transparent; surface with fine growth lines; about 0,19 length of aperture.

Radula (Figs 104–105) with slender tricuspidate rachidian; median cusp slightly longer than side cusps, intermediary denticles vestigial; lateral plates with rather broad bases. About 36 rows.

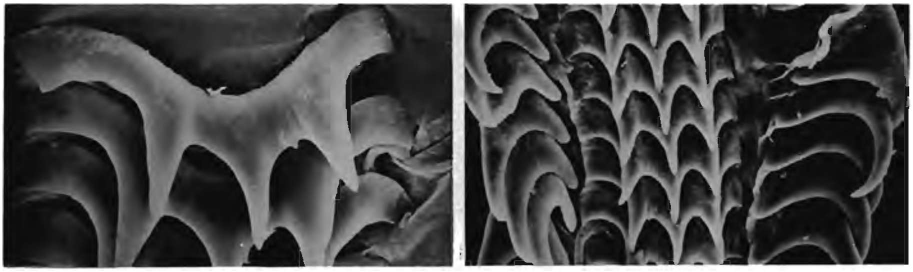
Distribution: Continental shelf of eastern South Africa from Zululand to Natal south coast, in about 120 metres.

Type material: Holotype (Fig. 87, 88) NM B1101/T2465, trawled off St Lucia area, Zululand, don. A. Rouillard, 12/v/79; dimensions 35,8 × 17,3 mm. Paratype one, NM B1075/T2466, trawled off Zululand or Mozambique, don. A. Visagé. Paratype two, SAM A1797, 'off Cape St Blaize, 40 fms.' (see below).

Additional material: A fragment of body whorl was dredged in 120 metres off Park Rynie (30°22'S, 30°51'E) on a sponge/rubble bottom (NM: RK).

Taxonomy: This distinctive new *Ancilla* may prove to be a sister-species of *A. djiboutina* from the Aden–Oman region, but the soft parts of that are still unknown. Paratype 1 of *A. rouillardi* fortunately contained the decomposed remains, from which the operculum and part of the radula were recovered; the shape of the rachidian plates is unique among the ancillids so far studied. *A. rouillardi* resembles *A. djiboutina* in general colour pattern and shape, and in its almost flush ancillid band, extensive microshagreen sculpture and glassy hair-lines. *A. rouillardi* differs in its broader form, larger protoconch, evanescing ancillid groove (which does not form a labral denticle), coarser columella lirae and non- or barely-indented siphonal canal.

Although precise details of the occurrence of this species are unknown, it is doubtful whether it ranges as far south as Cape St Blaize, the locality attached to the SAM juvenile, which was collected by the s.s. *Pieter Faure*. Barnard (1963: 16) drew attention to a case of the accidental substitution of a Cape St Blaize label in another Natal/Zululand species, '*Lambidium macandrewi*' [=*Morum praeclarum* Melvill, 1918], and *Latirus mosselensis* Tomlin, 1932, another *Pieter Faure* species, supposedly dredged off Mossel Bay, has now been discovered living off northern Zululand.



104 105

Figs 104–105. *Ancilla rouillardi*, SEM photographs of air-dried radula. 104, Rachidian plates, scale line = 0,01 mm. 105, Rachidians and laterals, scale = 0,1 mm.

Ancilla chrysoma sp. n.

Figs 4, 51, 91–92, 98, 207

Diagnosis: Shell more or less subcylindrical and bilaterally asymmetrical, right side flattened with its periphery basal; breadth/length 0,43–0,49, spire angle 59°–76°, aperture/total length 0,65–0,72; aperture constricted posteriorly, base very oblique; columella pillar narrow and only slightly twisted, with gently convex edge, 0,52–0,59 length of labium; columella lirae 4–9 (usually 6), thin, more or less evenly spaced; fasciolar band microshagreened only along anterior border; paries smooth; orange-yellow, darker on base and above suture, suture bordered by a diffuse, milky zone; columella tinged with yellow. Maximum length about 41 mm.

Description:

Quantitative (N = 25):

Breadth/length: 0,43–0,49 (M = 0,45; SD = 0,01)
Aperture/total length: 0,65–0,72 (M = 0,69; SD = 0,02)
Spire angle: 59°–76° (M = 69°; SD = 4,6°)
Maximum dimensions: 40,9 × 17,4 mm
Minimum adult dimensions: 31,0 × 13,6 mm

Shell usually subcylindrical, sometimes somewhat oblong-ovate; bilaterally asymmetrical, left side gently convex with median periphery, right side slopingly flattened, with basal periphery; shoulder feeble or absent. Spire fairly high, usually orthoconic, not strongly calloused, sutures flush, whorls sometimes slightly convex; apex somewhat papilliform. Aperture constricted and narrowly acute posteriorly, widest just posterior to midline, curved to left anteriorly; siphonal canal wide and rather shallowly notched, base strongly oblique. Surface smooth, apart from weak growth-lines; columella pillar and anterior fasciolar groove microshagreened, with finer microshagreen sculpture along margin of siphonal notch, behind labrum and on paries. Ancillid band 0,39–0,68 width of fasciolar band at labium, very slightly declivous, almost flush with adjacent surfaces; ancillid groove deep, terminating in a rather sharp denticle; fasciolar band gently convex. Columella pillar narrow and slightly oblique, longer than paries (ie. occupying 0,52–0,59 of labium), its inner edge gently convex, with a moderately deep basal sinus; surface with 4–9 thin, sharp lirae (88% of sample with 5–7 pleats, only 4% with more), the outermost 1–2 sometimes separated from the rest by a wider interval; anterior fasciolar groove wide but shallow. Paries flattened or slightly convex, without a ridge or scar-like impression. Labrum thickened, slightly incurved, forming a distinct anal notch posteriorly, in side view almost straight and distinctly prosocline.

Teleoconch whorls about 3,5. Protoconch (Fig. 51) narrowly domed, of about two whorls, white, maximum diameter about 1,8 mm.

Colour moderate orange-yellow to between strong orange and deep orange-yellow, basal callus and area above penultimate suture darker (strong orange-yellow), area below suture of body whorl with a very diffuse white zone; ancillid groove filled by an inconspicuous white line; columella white, tinged towards its left side with yellow, aperture light orange to almost white.

Distribution (Fig. 207): South-eastern India.

Type material: Holotype NM J441/T2462, Madras, leg. P. Mukundan, 1977; 35,9 × 15,8 mm. Paratypes: INDIA: Madras (NM G8704/T2464; P. Mukundan, twenty-two; NM G8727/T2463: D. Peled, 1976, one); Pondicherry (NM G7849/T2467: A. R. Bhagat, 1976, two).

Habitat: Shores of mixed sand and mud, at low tide (pers. comm. A. R. Bhagat).

Taxonomy: This striking new species is somewhat intermediate in characters between *Ancilla ampla* and *A. cinnamomea*, combining the narrow columella and relatively slender form of the former with the basic colour pattern of the latter. It differs from both in its larger size, more asymmetrical form and vivid golden coloration. Unfortunately only cleaned shells are available.

Ancilla (Sparellina) eburnea (Deshayes, 1830)

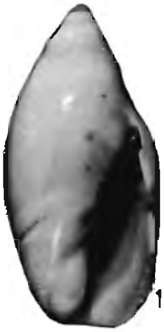
Figs 48, 101, 106–111, 114–120

Ancilla eburnea Deshayes, 1830: 42; *idem*, 1844: 591; Kiener, 1844: 23. Type locality unknown.
Ancillaria crassa Sowerby, 1859: 60, pl. 214, figs 86, 91; Reeve, 1864: pl. 9, fig. 34; Weinkauff, 1878: 24, pl. 8, figs 1, 3, 8, 10; Tillier & Bavay, 1905: 176, 177 (**syn. n.**). Type locality: Red Sea.
Ancilla crassa; Moazzo, 1939: 144.
Ancillaria striolata Sowerby, 1859: 60, pl. 212, figs 24, 25; Reeve, 1864: pl. 9, fig. 29; Weinkauff, 1878: 36, pl. 11, fig. 2 (**syn. n.**). Type locality unknown.
Ancillaria cinnamomea (*non* Lamarck); Cooke, 1885: 334.
Not *Ancillaria eburnea*; Sowerby, 1859: 61, pl. 214, figs 84, 85, *et auct.* [= *Ancilla ovalis*, q.v.]

Diagnosis: Shell varying in shape from subcylindrical to squat with a very tumid body whorl, breadth/length 0,41–0,56, spire rather sharp and elevated, angle 51°–80°, aperture/total length 0,47–0,71; apex somewhat papilliform, diameter 1,0–1,2 mm; ancillid band narrow, 0,25–0,71 width of fasciolar band, sometimes sunken; paries usually with a distinct longitudinal ridge and sunken 'scar'; columella pillar 0,49–0,55 length of labium, with 2–7 lirae; microshagreen sculpture sometimes extending onto ancillid band; labrum with a sharp denticle; base barely oblique. Ivory-white to pale yellowish-brown or light orange-yellow, sometimes paler below suture; aperture yellow or pale brown. Maximum length 26 mm.

Description:
Quantitative (N = 103):
Breadth/length: 0,41–0,56 (M = 0,49; SD = 0,03)
Aperture/total length: 0,47–0,71 (M = 0,59; SD = 0,06)
Spire angle: 51°–80° (M = 63,9°; SD = 5,6°)
Maximum dimensions: 25,8 × 12 mm
Minimum adult dimensions: 7,3 × 4,0 mm

Shell fairly thick, labrum sometimes almost varicoid; shape oblong-ovate to subcylindrical, with a high, rather acutely conical spire; body whorl convex-sided, in obese shells sometimes shouldered posteriorly, greatest width near middle. Spire orthoconic or slightly coeloconic, whorls gently convex, producing a somewhat undulating profile, sutures masked by a milky callus film. Adult whorls with occasional varicoid lines. Aperture somewhat trigonal, acute to acuminate behind, maximum width more or less median, siphonal notch barely indented; base barely oblique. Ancillid band relatively narrow, 0,25–0,71 width of fasciolar band, deep to shallowly sunken, posterior border barely or not declivous;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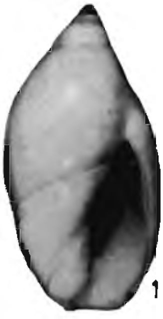
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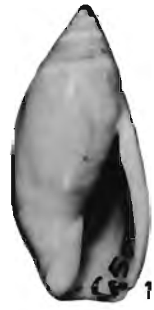
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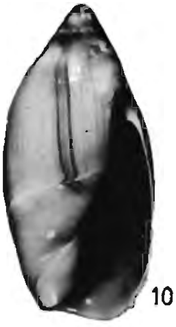
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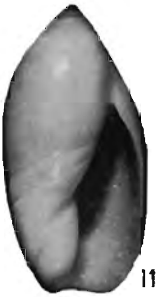
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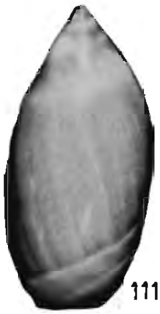
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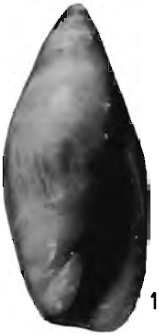
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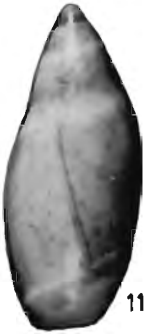
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Figs 106–113. *Ancilla eburnea* (Deshayes, 1830) and *A. lineolata* (A. Adams, 1853). 106–108: *A. eburnea*, typical form: 106, Lectotype, MHNP colln., 13,4 × 6,6 mm; 107, Obese form, Suez, NM G5089, 21,8 × 11,2 mm; 108, Narrow form, same data, 18,9 × 8,8 mm. 109–111: *A. eburnea* form *striolata*: 109, off Eilat, 2–3 m, NM G8499, 12,3 × 5,9 mm; 110, Obhur, Saudi Arabia, NM H9849, 18,6 × 9,4 mm; 111, Same data, 17,6 × 8,8 mm. 112–113: *A. lineolata*, off Eilat, TAU colln., 9,6 × 4,1 mm.

fasciolar band tumid, with rather conspicuous, oblique growth-lines. Columella pillar relatively wide and strongly twisted, with 2–7 oblique ridges, of which the outermost one is often separated from the others by a slightly wider groove; columella pillar only slightly foreshortened, so that base is barely oblique, and equal to 0,49–0,55 length of labium, lip straight or gently convex, sometimes slightly angular posteriorly; basal sinus narrow to wide. Paries strongly concave anteriorly and slightly so posteriorly, parietal ridge strong and angular, extending length of paries and continuing down into posterior end of aperture; inner face of paries with a scar-like concavity; posterior angle of aperture with a fine spiral thread visible deep within interior. Parietal callus fairly thick, particularly at junction with labrum, in obese specimens often rendering peristome complete; callus microshagreened, as is columella, back of labrum and siphonal border of fasciolar band, traces often occurring on ancillid band as well. Labrum slightly concave to convex in side view, sometimes thick, with a well-developed basal tooth.

Teleoconch whorls 2,5–4 in adult. Protoconch (Fig. 48) of 1,5–1,75 whorls; clearly delimited, shape broadly conical, apex well rounded; diameter 1,0–1,2 mm.

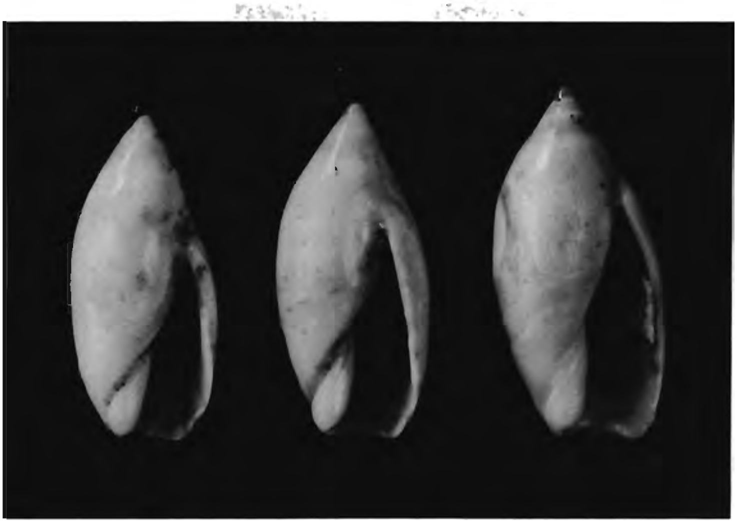


Fig. 114. *Ancilla eburnea:* Syntypes of *Ancillaria striolata* Sowerby, 1859, BM(NH) 197216; lectotype on right, its dimensions 13,4 × 6,6 mm. Photograph courtesy BM(NH).

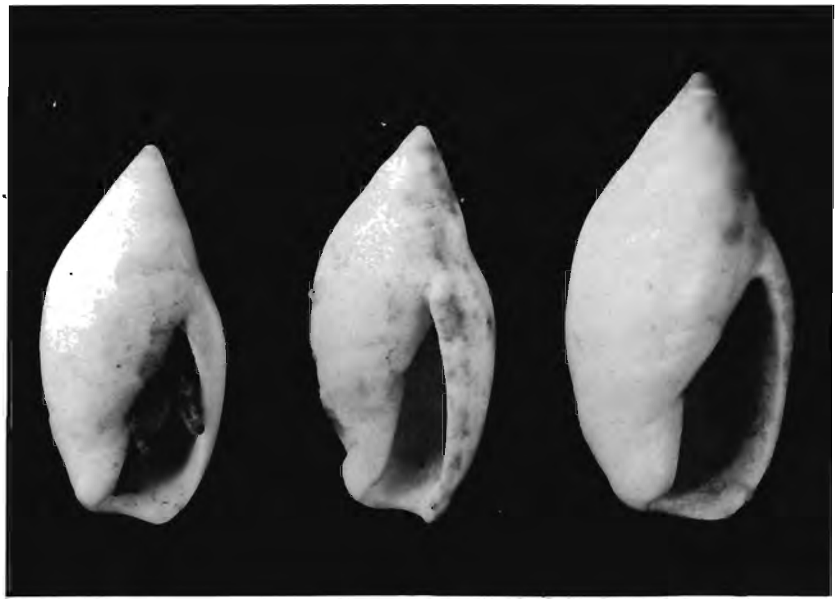


Fig. 115. *Ancilla eburnea:* Syntypes of *Ancillaria crassa* Sowerby, 1859, BM(NH) 197934; lectotype in centre, dimensions 17,8 × 9 mm. Photograph courtesy BM(NH).

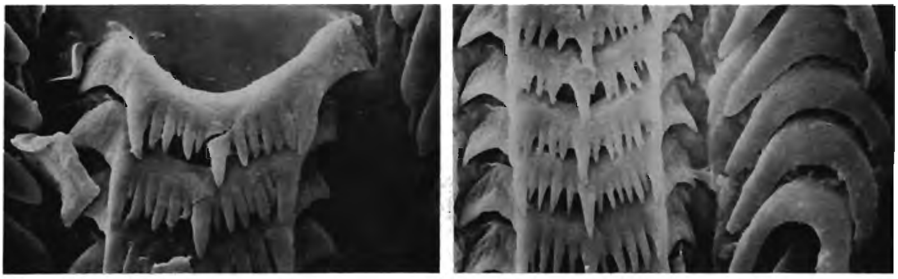
Colour yellowish-white to light yellowish-brown or orange-yellow, sutures marked by a whitish zone, frequently followed by a darker one; growth-lines often darker than intervals and axial hair-lines of colour may be present, spire sometimes stained with orange; aperture tinged with orange-yellow or light brown.

Operculum delicate and transparent, pale yellowish, about 0,33 length of aperture, shape oblong-ovate, nucleus subterminal.

Radula (Figs 116–117) with pectinate rachidian plates, the median cusp slightly stronger than the main side ones, the intermediary denticles strong (although irregular) and close-set, 4–6 per side; lateral plates normal. About 60 rows.

Distribution: Red Sea (Fig. 120).

Material examined: SUEZ CANAL: (MHNP: Letellier, 1949, one); Great Bitter Lake (RNHL: C. Beets, numerous); lagoon on west side between Lake Timsah and Toussoum, black mud (BM(NH) 1928.3.30.283: Cambridge Exped., 1924, one); island in Little Bitter Lake, 2–3 metres, mud with *Diplanthera* (BM(NH) 1928.3.30.119: Cambridge Exped., 1924, one); shore of Lake Timsah (BM(NH) 1928.3.30.318, 356: Cambridge Exped., 1924, two). GULF OF SUEZ: Port Taufig (BM(NH): 1928.3.26.89: Cambridge Exped., 1924, one); Suez (USNM 23011: Macandrew, one; MHNP: Jousseaume, 1921, and Letellier, 1949, fifteen; NM G5089: W. Falcon, three; IRSN: Jousseaume, three; RSM: R. McAndrew, four; Cambridge Univ. Museum: R. McAndrew, twenty-two); Ras Matarma Lagoon (HUJ: SLR 2183, one dead, 2196, five live); Ras Matarma point and beach (RNHL: C. Beets, 1948/49, numerous); Ras Sukheir (RNHL: C. Beets, two); El Bilaiyim lagoon (HUJ: SLR 2654, one); Ras Gemsa (RNHL: C. Beets, 1949, three juveniles; RNHL: Heybroek, 1948, eight); Ras el Sudr (TAU, one worn; RNHL; C. Beets, 1948/49, one); Ras Diheisa (RNHL: C. Beets, one worn); Nebwi (RNHL: C. Beets, juveniles); Ras Gharib (RNHL: C. Beets, 1948/49 two); Shadwan Island (NMV: Pola Exped. 37645, three). EGYPT: Al Ghardaqa (Hurghada) (RNHL: C. Beets, 1948/49, one; NMV: E. Stüber, 1958, one); Ras Bânâs (USNM 604104: S. Vatikiotis, two).



116 117

Figs 116–117. *Ancilla eburnea:* SEM photographs of air-dried radula; Ras Matarma. 116, Rachidian plates, scale line = 0,01 mm; 117, Rachidians and laterals, line = 0,1 mm.

Form *striolata*: GULF OF AQABA: Eilat (NM G8499: S. Lavi, five, in 2–3 metres; NM G7900: S. Lavi, two in 4–6 metres; NM 91164: D. Peled, two, TAU 25: L. Fishelson, 1967, one; TAU: C. Lewinsohn, 33–34 and 35–50 fathoms, two). SAUDI ARABIA: Senāfir Island (NMV: Pola Expedition, one); Obhur, 47 km north of Jiddah (Mrs M. Williams colln.: C. Ham, 23; NM H9840: C. Ham, three). ETHIOPIA: Dahlak Island, 1–3 metres (NM G8502: D. Peled, 1977, one).

Unlocalised or erroneous records: 'Red Sea' (RNHL: Ruyssenaers, two; MHNP: Letellier, 1949, one; BM(NH): V. Macandrew, two); 'Aden' (HUJ: 5725: Sowerby & Fulton, one; AMS C40147: C. Hedley, two); '? Eilat' (TAU 32, one); 'Port Blair, Andaman Island' (BM(NH)): (Winckworth ex Booley); 'Port Elizabeth' (BM(NH): V. Macandrew); 'Loc.?' (BM(NH) 54.6.30.18, one, very large).

Literature records: Tillier & Bavay (1905) record *crassa* from the length of the Suez Canal to within 50 km of Port Said, although it is probable that this material included *A. lineolata*.

Type material: Three syntypes of *Ancillaria eburnea*, originally in the École des Mines collection (as No. 12768), have now been transferred to the MHNP. The lectotype (Fig. 106), which measures 13,4 × 6,6 mm, is here figured. The type locality was unknown to Deshayes, but is here designated as Suez, where the species is common (fidé Macandrew in Cooke, 1885) and would have been accessible to early 19th century collectors.

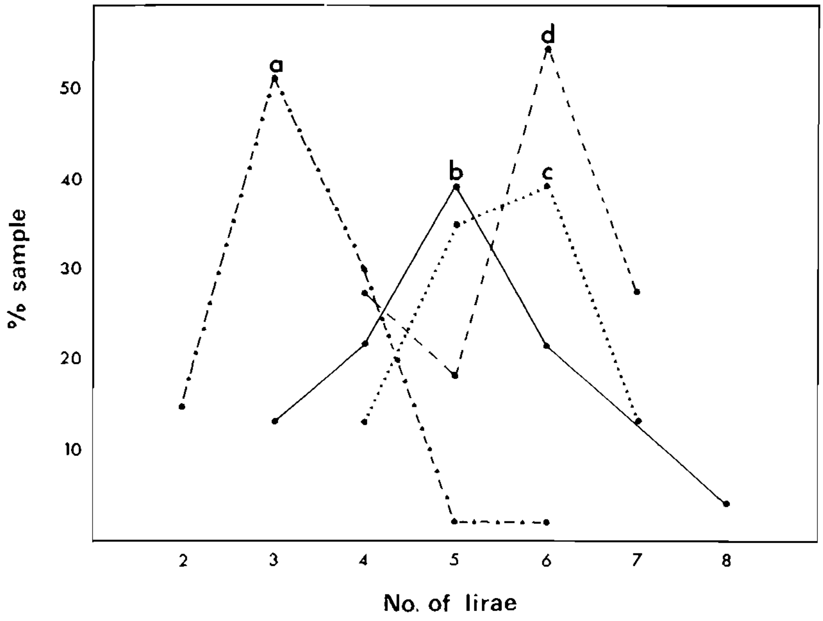


Fig. 118. *Ancilla eburnea* species-complex: frequency distribution of columella lirae. a, *A. eburnea* ss. (N = 47); b, *A. farsiana* (N = 23); c, *A. eburnea* form *striolata* (N = 23); d, *A. tronsoni* (N = 11).

Three syntypes of *A. crassa* (Fig. 115) are preserved in the H. Cuming collection, BM(NH) no. 197934; the middle-sized specimen, measuring 17,8 × 9 mm, may have been one of those figured by Sowerby (1859: figs 90, 91) and is designated as lectotype. Of the three syntypes of *A. striolata* (BM(NH) 197216), one which measures 15,9 × 7,7 mm and has a slip bearing the number '17' pasted inside the aperture, appears to be that shown in dorsal view as Sowerby's pl. 212, fig. 24, and is regarded as the lectotype (Fig. 114). The identities of *crassa* and *striolata* are discussed below.

Habitat: see below.

Taxonomy: The identity of *Ancillaria eburnea* has remained uncertain until now. The types were never figured, and Kiener (1844), who intended illustrating the species (presumably from syntypic or homeotypic material), somehow omitted this figure from his plates. Subsequent workers were left to speculate as to the true identity of *eburneà*, and most applied it to narrow specimens of *Ancilla ovalis*. Examination of a syntype of *A. eburnea*, kindly loaned by Dr P. Bouchet, shows it to be an example of the species better known as *Ancillaria crassa*, over which *nomen* it has priority. Usage of the name *eburnea* by recent workers (eg. Biggs, 1973), albeit in an incorrect sense, precludes its rejection as a *nomen oblitum*.

In shell-characters *Ancilla eburnea* is almost indistinguishable from *Ancilla farsiana*, differing chiefly in being somewhat broader, with a narrower ancillid band and shallower parietal scar. *A. farsiana*, however, has a tricuspidate rachidian, quite unlike the pectinate plate of *eburnea*. Even more problematic is the relationship between *eburnea* and *A. lineolata* (q.v.), which in sympatry may be quite indistinguishable.

A. eburnea appears to comprise two populations. One (*eburnea* ss) is centred about the Gulf of Suez, the other (*striolata*) ranges from the Gulf of Aqaba and Saudi Arabian coast to the Dahlak Archipelago. Separation of the two at the subspecies level may prove to be warranted when distribution and variation patterns have been plotted in detail. For the present they are treated as infrasubspecific forms. Of some significance is the apparent correlation with environmental factors such as salinity and temperature: (a) Gulf of Suez form (*eburnea* ss): This form (Figs 106–108) is characteristic of the silts and relatively cool, hypersaline waters of the north-western arm of the Red Sea, where mean salinity increases from about 40,5‰ at the Straits of Jubal to about 43,00‰ at Suez. It also inhabits lagoons such as that at Ras Matarma, where salinities of 43,28–49,49‰ are recorded. Furthermore, it has penetrated the Suez Canal, and occurs in sections such as the Great Bitter Lake, where salinity may exceed 55‰. Specimens from the Suez Canal and from these hypersaline lagoons tend to be stunted in size, sometimes becoming fully adult at lengths of 7–10 mm. Temperature-variation within the range is about 18–27° C. Vertical range is from low-tide level to at least 2–3 metres depth. Geographically, the Suez form appears to reach its southern limits at Ras Bânâs.

This form varies greatly in proportions, having a CV for breadth/length of 6,1, as opposed to 2,0 for *striolata*. This results from the frequent development of abnormally squat individuals with a deeply-sunken ancillid band; these are absent in the *striolata* population. Although extremes appear very difficult, such obese examples (*crassa*) are linked to typical specimens by a series of intermediates, and moreover appear to occur sympatrically with them.

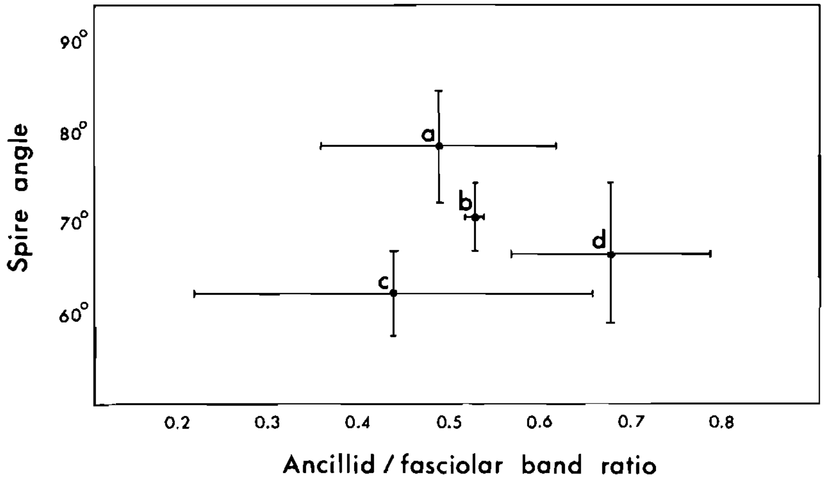


Fig. 119. *Ancilla eburnea* species complex: relationship between spire angle and ancillid band/fasciolar band ratio; mean and SD only. a, *A. tronsoni* (N = 11); b, *A. eburnea* form *striolata* (N = 20); c, *A. eburnea* ss. (N = 83); d, *A. farsiana* (N = 51).

Coloration in the Gulf of Suez population varies from yellowish-white to pale orange-yellow, the aperture being orange-yellow. The columella pillar is smoother than in *striolata*, with fewer columella lirae (range 2–6, mean 3,26), and the ancillid band is narrower, with a mean width of 0,43 of the fasciolar band.

(b) Saudi Arabian form (*striolata*): Examples resembling the lectotype of *Ancillaria striolata* are available from the Jiddah (Jedda) area of Saudi Arabia and from the Dahlak Archipelago, while a dwarf form inhabits the narrow shelves of the Gulf of Aqaba (Eilat). Typical *eburnea* appears to be absent from these areas. The form (Figs 109–111) thus appears to be associated with somewhat warmer temperatures (the surface waters of the Gulf of Aqaba may be 6° C higher than at Suez, for example) and lower salinities (mean 37–40‰). From the typical Suez form, *striolata* usually differs in being coloured with light yellowish-brown, save for a pale subsutural zone, and in having a brownish aperture. The spire is generally lower and less acute, the body whorl tends to be more evenly convex, the columella edge is less flattened and the basal sinus is slightly wider. Columella lirae are more numerous, ranging in number from 4–7 (mean 5,5). Finally, the ancillid band is somewhat wider (mean width = 0,52 of fasciolar band at aperture).

The largest specimen examined from the Gulf of Aqaba measures 14,0 × 6,9 mm. None, however, have a thickened lip and these may prove to be immature. Such specimens are sometimes impossible to separate from *A. lineolata* with any degree of certainty.

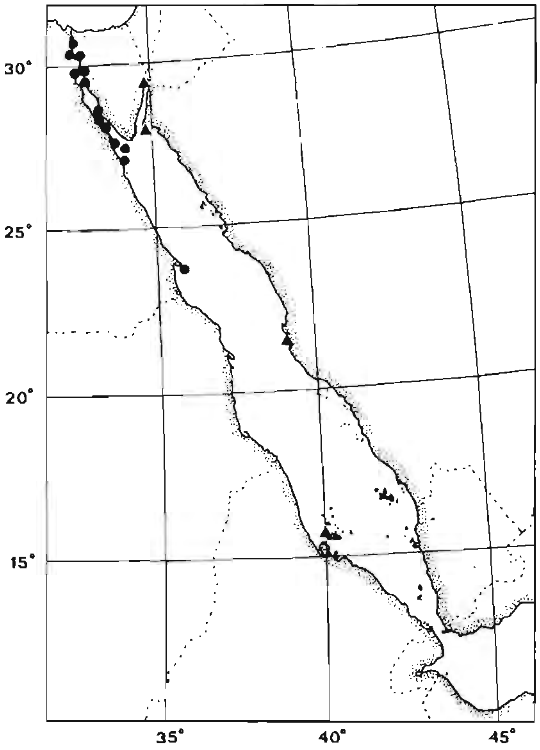
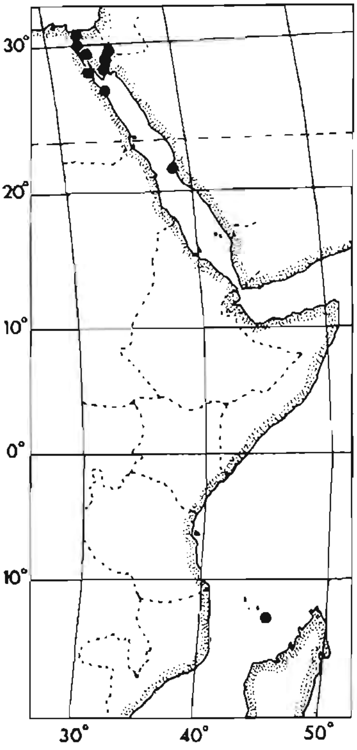

30°
25°
20°
15°
35°
40°
45°

Fig. 120. *Ancilla eburnea*, distribution.
● = typical form, ▲ = form *striolata*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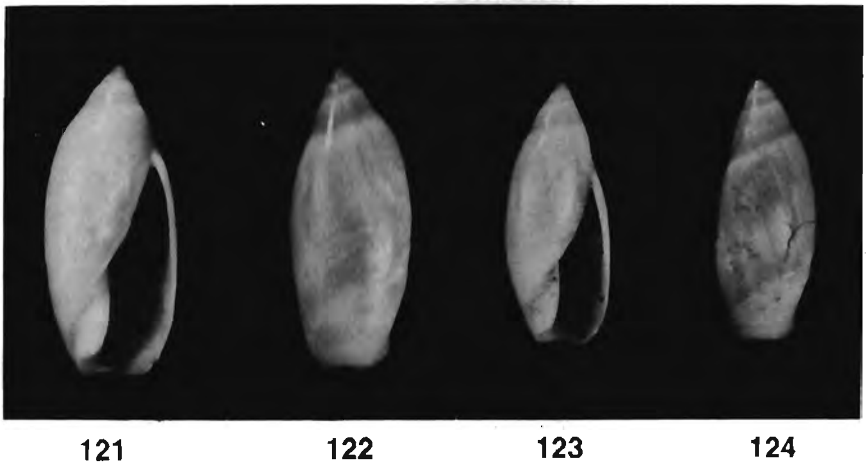
40°
50°

Fig. 125. *Ancilla lineolata*, distribution.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122
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124

Figs 121–124. *Ancilla lineolata* (A. Adams, 1853): 121, 122, Lectotype, BM(NH) 197217, 13,7 × 6,0 mm. 123, 124, *Ancillaria oryza* Reeve, 1864, holotype, BM(NH) 197215, 11,7 × 4,8 mm. Photographs courtesy BM(NH).

Variation in proportions between the Gulf of Suez sample (N = 83) and the Saudi Arabian one (N = 51) may be tabulated as follows:

	Suez	Saudi Arabia
Breadth/length:	0,41–0,56	0,47–0,52
	M = 0,49	M = 0,50
	SD = 0,03	SD = 0,01
Aperture/total length:	0,47–0,67	0,61–0,71
	M = 0,57	M = 0,67
	SD = 0,04	SD = 0,03
Spire angle:	51°–72°	61°–80°
	M = 62,3°	M = 70,7°
	SD = 4,7°	SD = 3,7°

Ancilla (Sparellina) lineolata (A. Adams, 1853)

Figs 47, 103, 112–113, 121–126

Ancillaria lineolata A. Adams, 1853: 271; Sowerby, 1859: 60, pl. 212, figs 22, 23; Reeve, 1864: pl. 10, fig. 35. Type locality unknown.

Ancilla oryza Reeve, 1864: pl. 11, fig 43; Weinkauff, 1878: 40, 12, fig. 8 (after Reeve) (**syn. n.**). Type locality unknown.

Ancillaria albifasciata (*non* Swainson, 1825): Pallary, 1926: pl. 10, fig. 22.

Ancilla cinnamomea (*non* Lamarck, 1801): Cooke, 1885: 334; Moazzo, 1939: 144; Barash & Danin, 1972: 357.

Not *Ancilla lineolata*; Melvill & Standen, 1901: 427; Dautzenberg, 1929: 171; *idem*, 1932: 26.

Diagnosis: Shell small (less than 14 mm), narrow (breadth/length 0,42–0,49) with high spire (angle 45°–64°, aperture/total length 0,50–0,65); ancillid band flattened, more or less flush, parietal callus feeble, without a distinct ridge or 'scar'; columella pillar 0,41–0,49 length of labium, with 3–4 lirae; white to light yellowish-brown with close axial hair-lines and a white subsutural zone.

Description:

Quantitative (N = 44):

Breadth/length 0,41–0,49 (M = 0,45; SD = 0,02)
Aperture/total length: 0,50–0,69 (M = 0,58; SD = 0,04)
Spire angle: 45°–67° (M = 55°; SD = 5,7°)
Maximum dimensions: 14,0 × 6,3 mm
Minimum adult dimensions: 8,5 × 3,9 mm

Shell oblong-fusiform, with relatively high, orthoconic or gently cyrtoconic spire, apex somewhat papilliform, sutures not impressed, masked by callus, spire whorls sometimes slightly convex; body whorl with gently convex sides, periphery more or less median. Surface with faint growth-lines. Aperture narrowly acuminate behind, wide and somewhat effuse anteriorly, greatest width median or basal; base slightly oblique. Ancillid band 0,30–0,75 width of fasciolar band at labium, flattened, more or less flush with adjacent surfaces; fasciolar band gently rounded, sometimes slightly tumid, separated from columella by a wide, shallow groove. Columella pillar rather narrow, with 3–4 strong oblique ridges, of which the outermost is separated by a slightly wider groove; pillar equal to 0,41–0,49 of total length of labium, its edge gently convex. Paries very slightly convex, without distinct ridge or 'scar', covered by a thin callus. Microshagreen sculpture on fasciolar band, columella pillar and labral edge. Labrum inflexed and thickened posteriorly, in side view almost straight, with a sharp basal denticle; siphonal notch barely indented.

Teleoconch whorls 3. Protoconch (Fig. 47) narrowly domed, of about 1,5 whorls, maximum diameter 1,0–1,1 mm.

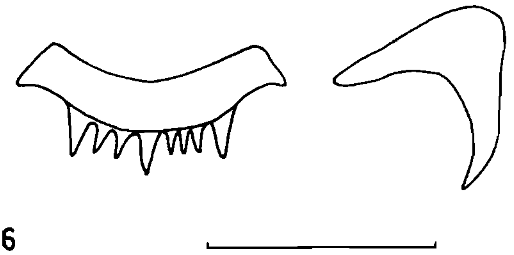
Colour generally light orange-yellow with a diffuse white subsutural band, usually suffused with brownish-orange above suture and at end of penultimate whorl, protoconch usually tinged with orange; distinct, close axial hair-lines of colour are present; columella pillar white, sometimes tinged with yellow; aperture medium orange-yellow to white. Entire shell sometimes white.

Operculum transparent and fragile, damaged in all specimens examined.

Radula (Fig. 126) with pectinate rachidian plate; median cusp slightly stronger than side cusps, intermediary denticles 1–3 per side; lateral plates with base and uncinus subequal in length. Number of rows about 60.

Distribution (Fig. 125–next to fig. 120): Northern Red Sea to Comoro Islands.

Material examined: GULF OF SUEZ: Ras Sudr (TAU 31: D. Poper, one worn); Suez (MHNP: Jousseaume, 1921, one); Ras Gharib (RNHL: C. Beets, 1948/49, one worn); Suez Canal (MHNP: Letellier); Great Bitter Lake, E. of Devesoir, 5 m. (TAU: SLCL 62, 66, one living, one dead); Lake Timsah, sand covered with brown algae and some *Halophila* (BM(NH) 1928.3.3.335: Cambridge University Exped., 1924, one). EGYPTIAN COAST OF RED SEA: Dishet el Daba, south of Hurghada (RNHL: C. Beets, 1949, one). GULF OF AQABA: Eilat (NM G8500: D. Peled, five, in sand on coral reef, 1,5–2 m; NM G2674: A. Zinger, seven: HUJ: G. Haas, six; HUJ: H. Steinitz, two; TAU 20: Dafni, 1968, one;



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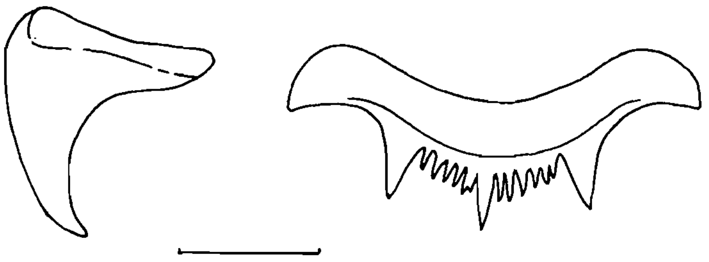

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Figs 126–127. *Ancilla* species, camera lucida drawings of radula. 126. *A lineolata*, Eilat; 127. *A. acuminata*, Dahlak Islands. Scale lines = 0,05 mm.

TAU 24: L. Fishelson, four; NM G2676: D. Peled, three; NM G1032: L. Samuel, 1973, three; TAU 7: C. Lewinsohn, 22–27 fath., two); Ras Burga (TAU 27: one, littoral); off Mersat Abu Samra, 27–30 fath., and 28–29 fath. (TAU 8, 10: C. Lewinsohn, 1969, three); off Nuweiba el Museina, 150–165 fath., and 180–220 fath. (TAU: C. Lewinsohn, four). SAUDI ARABIA: Obhur, 47 km N. of Jiddah (Mrs M. Williams colln., numerous). COMORO ISLANDS: Mayotte (BM(NH): Macandrew colln., ex Marie, five; AMS C40130: C. Hedley, one).

Type material: The type set of *Ancillaria lineolata*, preserved in the BM(NH) as No. 197217, consists of six specimens. Of these, four belong to *A. sarda* and *A. farsiana*; the remaining two, which include the specimen figured by Sowerby, are *lineolata* as here interpreted. The illustrated example (Figs 121, 122) which measures 13,7 × 6 mm, is designated as lectotype. The holotype of *Ancillaria oryza* (Figs 123, 124) is BM(NH) 197215. A type locality for *A. lineolata* is not designated here (see below).

Habitat: *A. lineolata* burrows shallowly in sand or mud from low spring tide down to about 365 metres. Although it would appear to range into waters of normal salinity, it is characteristic of salinities of 40–41‰ and may occur in parts of the Suez Canal where this exceeds 46‰. Temperature range 18–27° C and probably lower.

Taxonomy: Of all members of the genus *Ancilla*, *A. lineolata* is the most problematic. It is highly likely, in fact, that it will prove to be merely a minor genetic form of *Ancilla eburnea*. In brief it is only the evident presence of *lineolata* in the tropical Indian Ocean–where *eburnea* is absent–that lends support to its presumed specific distinctness. Even these records are from a single island, although a small and obscure species such as this could easily be overlooked elsewhere. Indeed, nothing agreeing in minute detail with the lectotype of *lineolata* has been seen, suggesting that at least one other population remains to be rediscovered. For this reason the question of a type locality for the species is left in abeyance. All material seen is closer to the high-spired *oryza* form.

In the Gulf of Suez *A. lineolata* can almost invariably be separated at a glance from *A. eburnea*, on account of its smaller size, thinner shell, more elongate form, flush (non-sunken) ancillid band, non-tumid fasciole, appreciably narrower columella pillar and yellowish- to pale orange-brown coloration. Nevertheless, immature, narrow *eburnea* shells may be inseparable from aberrant *lineolata*. In the Gulf of Aqaba the problem of identification may become overwhelming, and separation of *A. lineolata* from what appears to be the local dwarf form of *Ancilla eburnea* form *striolata*, is sometimes purely arbitrary. *A. lineolata*, however, tends to be somewhat narrower (mean breadth/length 0,45 as against 0,48), with a higher spire (angle 55° against 62,1°), less distinct axial hair-lines and darker colour. The possibility does exist that this intergrading Aqaba population is a hybrid one, but only local ecological studies could provide evidence. Finally, in Saudi Arabian material a real problem arises in separating *A. lineolata* from juvenile *eburnea* form *striolata*, only the presence of an adult lip providing a guide.

Ancilla (Sparella) tronsoni (Sowerby, 1859)

Figs 17–18, 46, 102, 131–135, 170

Ancillaria tronsoni Sowerby, 1859: 58, pl. 212, figs 20, 21; Reeve, 1864: pl. 9, fig. 30; (?) Weinkauff, 1878: 32, pl. 10, figs 2–3. Type locality: 'Red Sea' (erroneous).
Ancilla sp; Moura, 1972: 43, pl. 7, fig. 4.

Diagnosis: Shell oblong-ovate, breadth/length 0,47–0,54, with relatively low, blunt, mamilliform spire, aperture/total length 0,65–0,72, spire angle 69°–87°, protoconch diameter 1,2–2,0 mm; ancillid band barely sunken, 0,27–0,74 width of fasciolar band, labral denticle distinct; paries with a more or less shallow 'scar'; columella pillar 0,45–0,49 length of labium, with 4–7 lirae; pure white inside and out, sometimes with an orange spire blotch. Maximum length about 21 mm.

Description:
Quantitative (N = 11):
Breadth/length: 0,47–0,54 (M = 0,50; SD = 0,02)
Aperture/total length: 0,65–0,72 (M = 0,69; SD = 0,02)
Spire angle: 69°–87° (M = 78,6°; SD = 6,3°)
Maximum dimensions: 21,4 × 11,2 mm
Minimum adult dimensions: 14,9 × 8,1 mm

Shell oblong-ovate, sides of body whorl gently to strongly convex, greatest width posterior to middle; spire relatively low, with conspicuously mamilliform apex; sutures masked by callus. Aperture somewhat lanceolate, acute behind, wide at siphonal canal, greatest width median, base straight or slightly oblique. Ancillid band shallowly concave, 0,27–0,74 (mean 0,48) width of fasciolar band at aperture; fasciolar band convex. Columella pillar relatively wide and twisted, with 4–7 lirae (mean 5,6), of which the outermost may be slightly separated from the rest, 0,45–0,49 total length of labium, its lip convex, basal sinus variable. Paries straight or gently convex, usually with a sunken 'scar' but no distinct ridge. Microshagreen sculpture extensive on base, often reaching ancillid band. Labrum fairly thin, incurved posteriorly, straight and prosocline in side view, basal denticle sharp and fairly prominent.

Teleoconch whorls three. Protoconch (Fig. 46) domed, of two whorls, diameter 1,2–2,0 mm.

Uniform white inside and out, right side of spire sometimes with an orange stain.

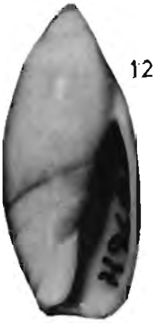
Operculum delicate and transparent, resembling that of *A. eburnea* but membranous and only about 0,14 length of aperture.

Radula (Figs 133–134) with tricuspidate rachidian, resembling that of *A. farsiana* (q.v.). About 78 rows.

Distribution (Fig. 135): apparently endemic to Mozambique.

Material examined: MOZAMBIQUE: Pangani, 10–15 ft (NM J440: A. Jenner, 1974, one); Quirimba Island (NM G3165: Mrs L. Gessner, two); Porto Amelia, living (NM F6622: A. Jenner, one); Conducia Bay (H83; H84; H87, G2683: K. Grosch, five); Lunga Bay, NW of Memba (NM H90: K. Grosch, one); between Inhaca Island and Zavora, *ex pisce*; NM G2671: C. Fernandes, two).

Erroneous literature records: 'Philippine Islands' (Reeve).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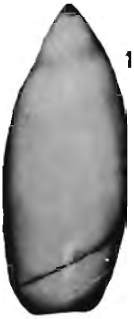
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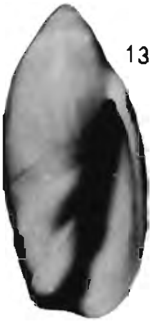
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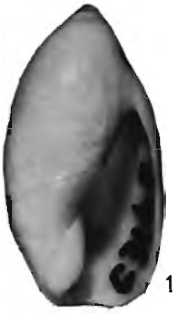
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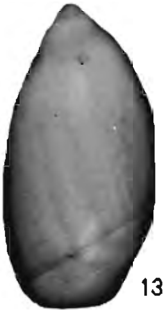
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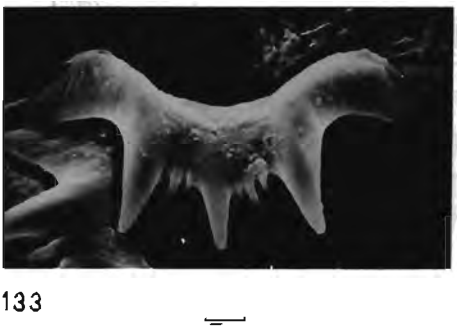
Figs 128–132. *Ancilla farsiana* sp. n. and *A. tronsoni* (Sowerby, 1859). 128–130: *A farsiana*: 128, 129, Holotype, NM J442, Muscat, 18,0 × 7,9 mm; 130, Paratype, NM G4510, Kuwait, 16,1 × 7,5 mm. 131, 132: *A. tronsoni*, Quirimba Island, NM G3165, 21,4 × 11,4 mm.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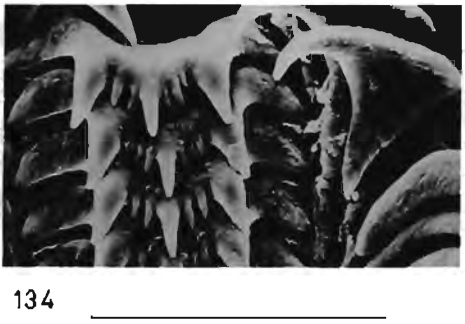
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Figs 133–134. *Ancilla tronsoni*, SEM photographs of air-dried radula; Pangani. 133, Rachidian plates, scale line = 0,01 mm; 134, Rachidians and laterals, scale = 0,1 mm.

Fossil records: PLEISTOCENE: Nacala, northern Mozambique (Moura, 1972).

Type material: The possible holotype (Fig. 170) is in the BM(NH), reg. no. 197939; it measures 12,1 × 6,3 mm. The type locality of 'Red Sea' is erroneous, and is here emended to Mozambique Island.

Habitat: Burrows in fine, sometimes muddy sand, from about a metre above L.S.T. to a depth of 4 metres or more.

Notes: The presumed holotype is a juvenile, younger than any of the available Mozambique specimens, although fully comparable in form with immature examples. The species will probably prove to range into Tanzania and Kenya.

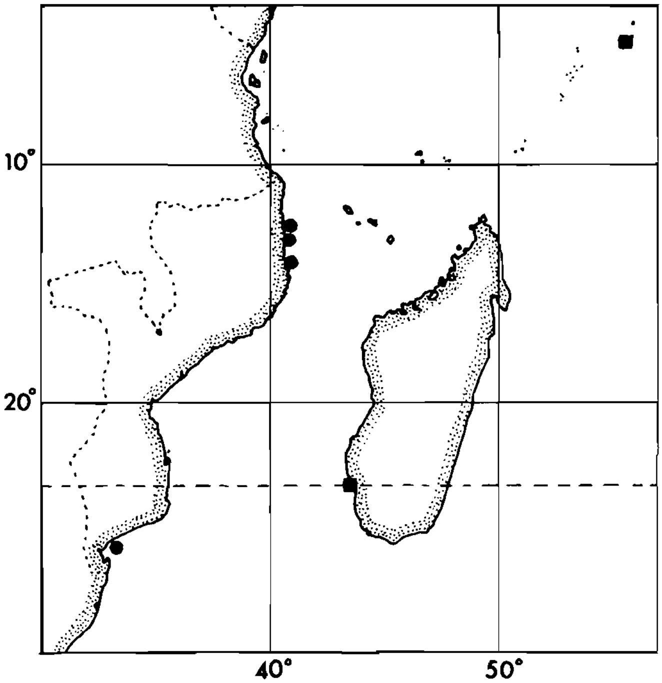


Fig. 135. *Ancilla tronsoni* (●) and *A. thomassini* (■), distribution.

Ancilla (Sparella) farsiana sp. n.

Figs 49, 100, 128–130, 136–138

Ancilla striolata (*non* Sowerby, 1859); Melvill, 1928: 110.

Diagnosis: Shell similar to *A. tronsoni*, but narrower (breadth/length 0,42–0,49) and more cylindrical, spire usually higher and more acute (angle 50°–93°, aperture/total length 0,56–0,72), protoconch smaller (diameter 1,0–1,2 mm), ancillid band generally wider (0,50–0,86 width of fasciolar band), parietal 'scar' usually deep; columella pillar 0,49–0,52 length of labium; colour white to pale orange-yellow. Maximum length about 21 mm.

Description:

Quantitative (N = 51):

Breadth/length: 0,42–0,49 (M = 0,45; SD = 0,02)
Aperture/total length: 0,56–0,72 (M = 0,64; SD = 0,04)
Spire angle: 50°–93° (M = 66,7°; SD = 7,7°)
Maximum dimensions: 20,9 × 9,0 mm
Minimum adult dimensions: 10,8 × 4,8 mm

Shell ovate-cylindrical, sides of body whorl gently convex, maximum width more or less median; spire cyrtoconic, usually high, sometimes low and obtuse, apex papilliform, whorls gently convex, sutures masked by callus. Aperture lanceolate, acute to acuminate behind, greatest width median to basal (ie. aperture more or less parallel-sided anterior to median); siphonal notch shallowly indented; base slightly oblique. Ancillid band not or shallowly indented, relatively wide (0,50–0,86 width of fasciolar band, mean 0,67); fasciolar band moderately convex. Columella pillar fairly wide and spirally-twisted, 0,49–0,52 length of labium, with 3–8 thin, oblique ridges (M = 4,9) of which the outer one may be separated by a slight gap; lip gently convex; basal sinus wide. Paries slightly convex, bearing a large, scar-like depression with a bordering longitudinal ridge posteriorly. Microshagreen sculpture as in *A. eburnea.*

Teleoconch whorls about three in number. Protoconch (Fig. 49) broadly conical, of about 1,5 whorls, diameter 1,0–1,2 mm.

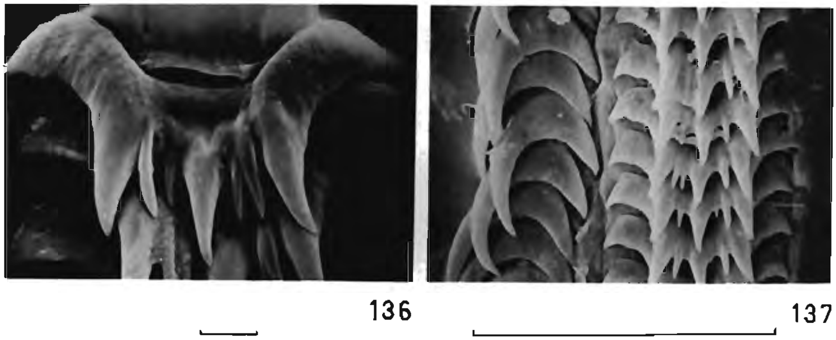
Colour varying from uniform white (inside and out) to pale orange-yellow, slightly darker on base and within aperture.

Operculum unknown.

Radula (Figs 136–137) with tricuspidate rachidian, the median cusp being slightly longer than the side ones, the narrow intervals usually bearing 1–2 sharp intermediary denticles, although these may be lacking altogether; lateral plates normal. Number of rows 60–62.

Distribution (Fig. 138): Persian Gulf to Gulf of Aden and north-western India.

Type material: Holotype NM J442/T2469, Muscat, Oman, W. Falcon colln. (? ex Townsend), dimensions 18,0 × 7,9 mm. Paratypes: GULF OF ADEN: Aden, South Yemen (NM G2685: H. Burnup, one juvenile). SULTANATE OF OMAN: Muscat (NM H9681: W. Falcon colln., six); BM(NH): F. W. Townsend, four, 'Muscat and Persian Gulf'); 25°28'48"N, 56°35'54"E, 91 metres (BM(NH): J. Murray Exped., one). TRUCIAL STATES: 25°01'30"N, 53°42'10"E, 23 metres (RNHL: A. J. Keij, one); 24°31'00"N, 53°04'20"E, 32 metres (RNHL: A. J. Keij, one); 24°46'40"N, 53°47'30"E, 15 metres (RNHL: A. J. Keij, two); 25°28'48"N, 56°35'34"E, 91 metres (BM(NH) 197860: J. Murray Exped., 27/xi/33, one dead). BAHRAIN: 27°27'55"N, 49°51'00"E, 22 metres (RNHL: A. J. Keij, five). KUWAIT (NM G4510: Mrs B. Glayzer, 1975, eight): west of Kuwait (BM(NH) 197859: Biggs, two); Falaika Island (NM G3361: Mrs B. Glayzer, 1974, three). IRAQ: Fao (BM(NH): 93.12.15.73: W. D. Cumming, one). IRAN: coast north of Kharg Island (Jazireh-ye-Khārq), 31 metres on very fine mud, and 7,5 metres on hard clay with gravel and shells (ZMC: G. Thorson, 23/iii/37, two dead, and one dead and one live, respectively); 29°42'00"N, 50°20'00"E, 7,5 metres, on hard brown clay, gravel and shell (ZMC: Thorson, 23/iii/37, six dead); 2 mi. S.E. of outer lightbuoy at Bushire (Būsehr), 7 metres on clay (ZMC: Thorson, 18/iii/37, 31 dead); 21 mi. S.E. to S.¾S. of Bushire lighthouse, 19 metres on very soft mud (ZMC: Thorson, 31/iii/37, one dead); Bushire anchorage, 6 metres (ZMC: 3/iii/37, two dead); Bandar-e-Lengeh (Linjah) (NMW: F. W. Townsend, three); Bandar Abbas (NMW: Townsend, one juvenile); Henjam Island (BM(NH) 197852: F. W. Townsend, 1906, twenty-seven); off Mussandam, 47 fathoms (NMW: Townsend, three); Galig Island (MM: Townsend, one; BM(NM) 197855: Townsend, three juveniles); 7 mi. E.N.E. of Patrick Stewart's Banks, Strait of Hormuz, 69 metres on soft grey mud (ZMC: G. Thorson, 19/iv/37, one dead); off



Figs 136–137. *Ancilla farsiana*, SEM photographs of air-dried radula; 'Persian Gulf'. 136, Rachidian plate, scale line = 0,01 mm; 137, Rachidians and laterals, scale = 0,1 mm.

Kuh-i-Mubarak, 45 fathoms (BM(NH) 197857: Townsend, four juveniles); off Mekran coast, 140 and 142 fathoms (BM(NH) 197858, 197856: Townsend, five juveniles). PAKISTAN: Karachi (MM: Townsend, one). INDIA: Bombay (BM(NH) 197850: Townsend, three; NMW: Townsend).

Habitat: Fine mud in 6–260 metres, mainly in areas with a salinity range of 37‰–44,5‰, and temperatures between 16° C and 34° C.

Taxonomy: *Ancilla farsiana* closely resembles *A. eburnea* of the Red Sea, another pale species with sunken ancillid band and conspicuous parietal 'scar'. Both similarly inhabit hypersaline waters, and could be treated as regional subspecies or even mere population variants, were it not that their radulae are totally different. The rachidian plate in *A. farsiana* is tricuspidate, in *A. eburnea* it is

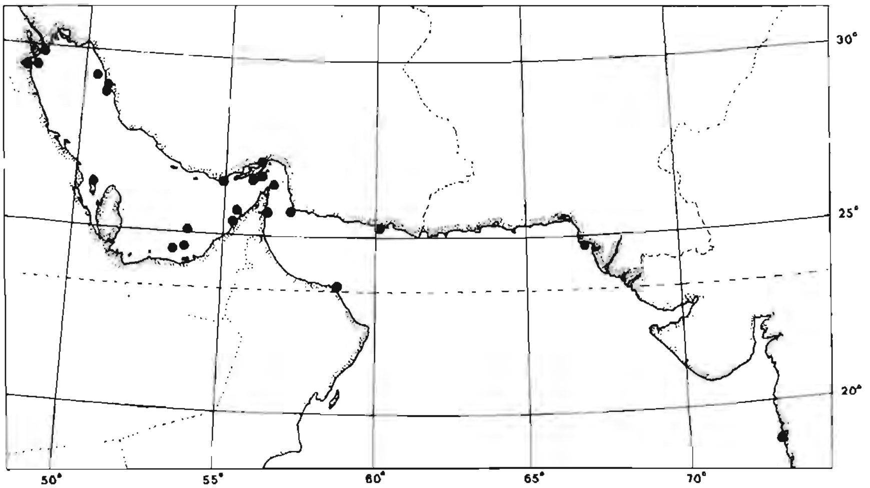


Fig. 138. *Ancilla farsiana*, distribution.

pectinate. Phenetic resemblances in shell morphology are thus probably the result of convergence. As compared with *A. eburnea*, *farsiana* has a more cylindrical, narrower shell (mean breadth/length 0,45, instead of 0,49), and a wider ancillid band (mean width 0,67 of fasciolar band instead of 0,48). Taking radular characters into consideration, the closest ally is probably *Ancilla tronsoni* from Mozambique. This differs from *farsiana* in its large mamilliform protoconch, more ovate form and constant pure white coloration.

Ancilla (Sparella) fasciata (Reeve, 1864)

Figs 55, 139–142, 146, 151–152

Ancillaria fasciata Reeve, 1864: pl. 9, fig. 44; Weinkauff, 1878: 31, pl. 10, figs 1, 9, pl. 12, figs 4, 7. Type locality unknown.
Ancilla fasciata; Turton, 1932: 32, pl. 6, fig. 238; (*partim*) Barnard, 1959: 69.
Ancilla ordinaria E. A. Smith, 1906: 27, pl. 7, fig. 4; Turton, 1932: 234 (**syn. n.**). Type locality: Port Shepstone.
Ancilla agulhasensis Thiele, 1925: 190, pl. 33(21), fig. 17. Type locality: 35°16′S, 22°26′7″E, 155 metres.
Ancilla marmorata (*partim*); Barnard, 1959: 70.

Diagnosis: Shell moderately thin, oblong-ovate, breadth/length 0,42–0,58, labrum gently convex; spire thinly calloused, low to high, angle 50°–90°; aperture with greatest width median, 0,49–0,73 of total length; parietal region without distinct callus or 'scar'; columella pillar oblique, with 2–6 subequal pleats; ancillid groove shallow, well below end of aperture, denticle weak; ancillid band relatively wide, flush, microshagreen sculpture inconspicuous, seldom extending onto ancillid band. White to brownish-orange, sometimes with diffuse lines or spots, columella pillar, ancillid band and a sutural zone often brown; sometimes uniform white. Maximum length 17,9 mm.

Description:
Quantitative (N = 67):
Breadth/length: 0,42–0,58 (M = 0,50; SD = 0,03)
Aperture/total length: 0,49–0,73 (M = 0,60; SD = 0,04)
Spire angle: 50°–90° (M = 67,2°; SD = 7,6°)
Maximum dimensions: 17,9 × 9,4 mm
Minimum adult dimensions: 10,7 × 5,7 mm

Shell oblong-ovate, left side sometimes more convex than right, labrum gently convex; greatest width median; spire low and obtuse to high and papillose; suture masked by callus but slightly impressed. Aperture with greatest width median, anteriorly tapering slightly, posterior end acute but not constricted; siphonal canal wide, very shallowly notched. Columella pillar oblique, 0,46–0,54 length of labium, with moderately convex to almost straight lip; lirae 2–6 in number (94,1% of sample N = 67 with 2–4 lirae), subequal in strength, gently rounded and sometimes weak; basal sinus moderately deep. Parietal callus feeble or absent. Ancillid groove shallow, forming a feeble labral denticle, and commencing on paries well below posterior end; ancillid band almost flush, 0,50–2,00 width of fasciolar band, which varies from declivous to flush. Microshagreen sculpture very fine and inconspicuous, seldom extending onto ancillid band. Labrum relatively thin, posteriorly incurved, in side view concave and prosocline.

Teleoconch whorls 2,5. Protoconch narrowly domed, of 1,5 whorls, maximum diameter 1,3–1,5 mm.

Colour variable. Typically white or pinkish-white with ancillid band, columella pillar and a sutural zone strong brown or brownish-orange, fasciolar band white; ancillid band showing within aperture as a brown zone. Ground-colour often tinged with moderate orange to medium orange-yellow, sometimes forming a diffuse pattern of lines or faint spots; uniformly light to moderate orange-yellow examples occur, as do pure white ones.

Operculum about 0,38 length of aperture, transparent yellow, with strong growth lines and microscopic radial striae.

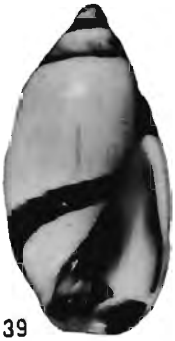
Radula: '60 rows, the three main cusps on central plate subequal, on one side of the median cusp one small cusp, on the other side 2 small cusps' (Barnard (1959), as *marmorata*); 'the broad central plate . . . shows five narrower, somewhat irregular serrations between the two large, triangular (side) cusps' (Thiele (1925), for *agulhasensis*, loosely translated).

Distribution: South and south-west coast of Cape Province (Republic of South Africa) to southern Mozambique.

Material examined: CAPE PROVINCE: off Lion's Head, west coast Cape Peninsula, 60 fath. (SAM A1871: s.s. *Pieter Faure*, one living); off False Bay, *ex pisce* (NM A4017: R. le Maitre, four); Mossel Bay (NM B3354: ex Albany Mus., four); off Cape St. Blaize, *ex pisce* (NM A2915, B471: R. le Maitre, twenty-eight); off Knysna, 40 fath. (SAM A1800: s.s. *Pieter Faure*, one broken); Jeffreys Bay (NM B3342: R.K. four; A2410: C. Connolly, numerous); Port Elizabeth (NM A2609: F. Graeve, six); Algoa Bay, 67 fath. (SAM A1799: one): Port Alfred (NM B3349: E. K. Jordan, seventeen; NM B3356: ex Albany Mus., numerous); off Glendower beacon, 66 fath. (SAM A1820: s.s. *Pieter Faure*, one living); Peddie coast (NM B3353: ex Albany Mus., ten); East London (NM B2132, B2133: B. J. Young, two); Kwelera (NM B3357: C. M. Connolly, one). TRANSKEI: Banyana River, east of Bashee (NM B1379: R.K., one); Xora (NM 5034, 6886: R.K. five); Mbotyi (NM A4768: R.K., five); Mzamba (NM 5036: R.K., one); 'Pondoland coast' (NM B1756, B3350, B3370: A. Filmer, numerous). NATAL: Palm Beach (NM A1600: R.K., one); Shelley Beach (NM B3343: R.K., five); Port Shepstone (NM 2119, B3338, B1758, 2713, 484, B3344: H. C. Burnup, twenty nine); Ramsgate (NM A2301: R.K.); Hibberdene (NM B1754: H. C. Burnup, one); Scottburgh (NM B3340: H. C. Burnup, three; NM B3345: W. Falcon, four); Sezela (NM B1757: H. C. Burnup, thirteen); Kelso (NM A2329: R.K., one); Umkomaas (NM B3346: H. C. Burnup, eight); Durban (NM B3347: Quekett, one) and off Durban in 85 fath. (SAM A1866: s.s. *Pieter Faure*, one); Umdloti Beach (NM B3348: H. C. Burnup, one) and off Umdloti River, 100 fath. (SAM A1875: s.s. *Pieter Faure*, one); Tongaat (NM 2714, 2715: H. C. Burnup, two); off Tugela River mouth, 37 fath. (SAM A1796: s.s. *Pieter Faure*, one). MOZAMBIQUE: east of lighthouse, Bazaruto Is, *ex pisce* (NM: E. Roscoe, three).

Literature records: Most of the material reported by Barnard (1959) as *A. fasciata* is actually *A. albozonata*.

Type material: Two syntypes of *Ancillaria fasciata* (Fig. 151) are in the BM(NH) 1874.12.11.38, ex Lombe Taylor colln.; the larger, which measures 13,2 × 6,4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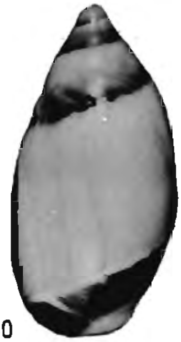
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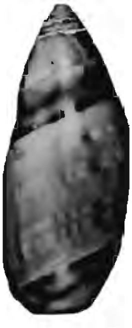
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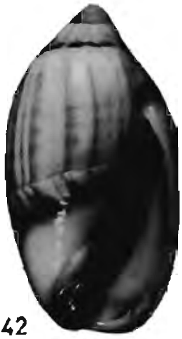
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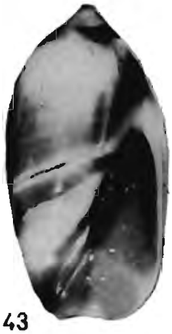
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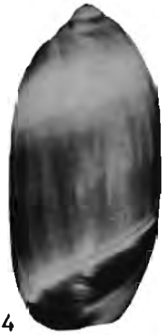
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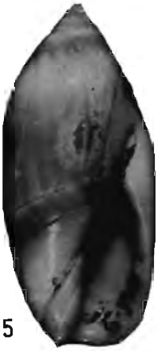
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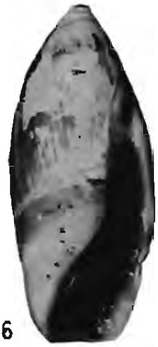
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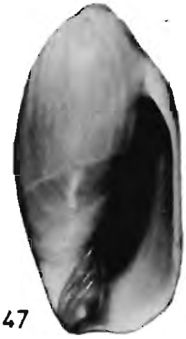
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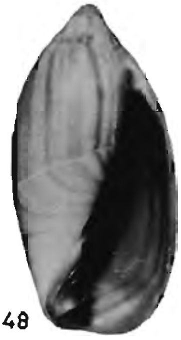
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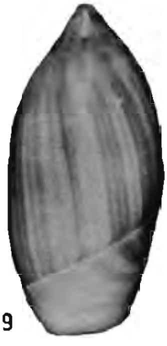
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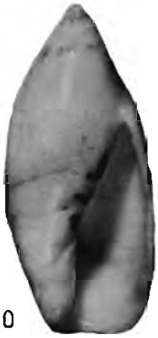
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Figs 139–150. *Ancilla fasciata* (Reeve, 1864), *A. albozonata* E. A. Smith, 1904, and *A. marmorata* (Reeve, 1864). 139–142, 146, *A. fasciata*: 139, 140, Mbotyi, NM A4768, 14,6 × 7,2 mm; 141, form *agulhasensis*, off Cape St Blaize, *ex pisce*, NM B471, 13,3 × 6,0 mm; 146, Mozambique form, off Bazaruto Lighthouse, *ex pisce*, NM colln., 10,4 × 4,3 mm. 143–145, *A. albozonata*: 143, Jeffreys Bay, NM B3140, 19,3 × 10,1 mm; 144, same data, 24,2 × 11,7 mm; 145, East London, off Buffalo River, 80 ft, NM 5747, 19,3 × 10,0 mm. 147–150, *A. marmorata*: 147, Gonubie, NM A1543, 18,3 × 9,1 mm; 148, 149, Kwelera, NM A546, 16,5 × 8,0 mm; 150, form *pura*, Scottburgh, NM 470, 19,9 × 9,1 mm.

mm, is the figured specimen and is designated as lectotype. Although the type locality was unknown, 'S. Africa' has been added to the card. This is here further restricted to Port Elizabeth. Two syntypes of *A. ordinaria* are in the same collection (BM(NH) 1906.6.23.25–26). The type material of *Ancilla agulhasensis* is in the collection of the Zoologische Museum, Berlin.

Habitat: lives infratidally, down to about 180 metres.

Taxonomy: *Ancilla fasciata* is a variable species with regard to both coloration and proportions. Narrow, bilaterally asymmetrical shells with high spires appear to differ markedly from large, ovate, obtuse-spired examples, particularly when shape coincides with different colour patterns. White specimens (*ordinaria* E. A. Smith, 1906) are common. On the Agulhas Bank a narrow bathymorph (*agulhasensis* Thiele, 1925) occurs (Fig. 141); here, the spire is more tapering (mean of 17 examples 61,3°, against 66,4° for N = 50 in beach shells), and the ancillid band is narrower (mean of ancillid/fasciolar band ratio 0,70 against 1,08).

Mozambique examples (not included among the quantitative data) may prove separable at the subspecies level, although only a few imperfect or juvenile examples have been seen. These are very narrow (breadth/length 0.41 in the only adult seen), small (maximum dimensions 10,4 × 4,3 mm), almost cylindrical in shape and pale in colour (Fig. 146).

Immature *fasciata* may be difficult to separate from young specimens of *A. marmorata* or *albozonata*. Adult *fasciata* resemble *marmorata* in the lightly calloused spire, uncalloused paries, thin labrum and an aperture with its greatest width median, therein differing from *A. albozonata*. *A. marmorata* is more oblong in shape than *fasciata*, with a larger aperture, straighter labrum, slightly wider protoconch and a total lack of colour bands.

Unfortunately it is not known from which specimens Barnard derived his radula figures of *fasciata*; as indicated above his material is composite.

Ancilla (Sparella) albozonata E. A. Smith, 1904, **stat. rev.**

Figs 56, 143–145, 154, 157

Ancilla albozonata E. A. Smith, 1904: 29, pl. 3, fig. 9; Turton, 1932: 32. Type locality: Port Alfred.
Ancilla ordinaria major Turton, 1932: 32 (**syn. n.**).
Ancilla cinnamomea (*non* Lamarck); von Martens, 1874: 28; Sowerby, 1892: 16.
Ancilla fasciata (*partim*); Barnard, 1959: 69, fig. 15 d, e (radula); Kensley, 1973: 179, fig. 633.
Ancilla marmorata (*partim*); Barnard, 1959: 70.

Diagnosis: Shell thick, oblong with straight labrum, breadth/length 0,45–0,53; spire covered by thick callus, exposing the papilliform apex, spire angle 54°–102°, aperture/total length 0,50–0,68; parietal region heavily calloused, sometimes with sunken 'scar', posterior end of aperture flanked by a thick callous pad; aperture strongly constricted behind, with its greatest width posterior to middle; columella pillar oblique, with 2–8 subequal lirae; ancillid groove shallow, near level of posterior end of aperture, denticle weak, ancillid band narrow, almost flush; microshagreen sculpture extending onto ancillid band. Colour reddish- or golden-brown, darker at sutures and on ancillid band; fasciolar band, ancillid groove and a broad subsutural band white; columella brown. Maximum length 25 mm.

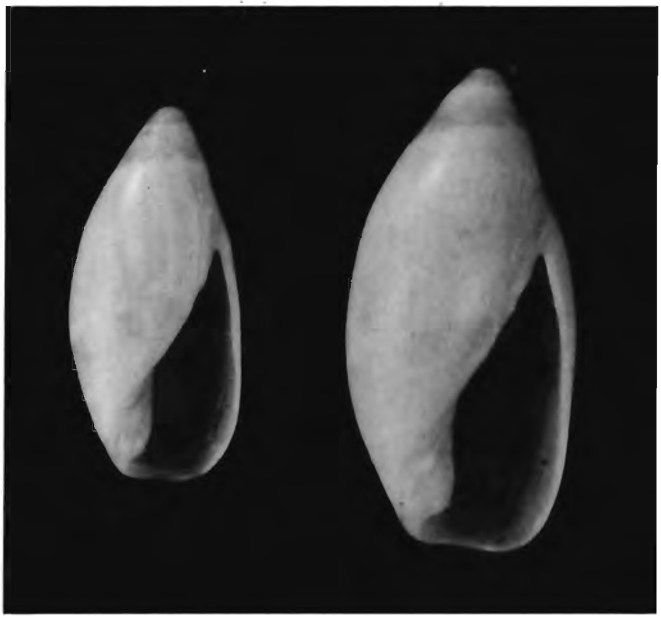


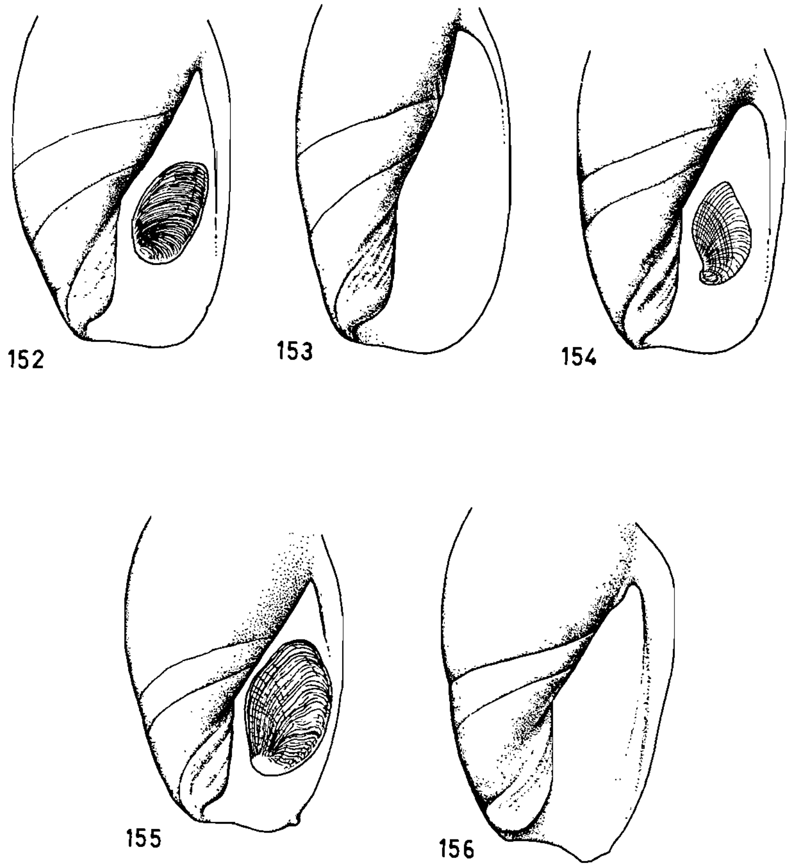
Fig. 151. *Ancilla fasciata*, syntypes, BM(NH) 1874.12.11.38. Lectotype on right, dimensions 13,2 × 6,4 mm. Photograph courtesy BM(NH).

Description:

Quantitative (N = 76):

Breadth/length: 0,45–0,53 (M = 0,49; SD = 0,02)
Aperture/total length: 0,50–0,68 (M = 0,60; SD = 0,04)
Spire angle: 54°–102° (M = 74,5°; SD = 11,7°)
Maximum dimensions: 25,1 × 12,1 mm
Minimum adult dimensions: 11,9 × 5,7 mm

Shell thick, oblong, right side more convex than left, labrum flattened, maximum breadth median, spire moderately low, varying from coeloconic to cyrtoconic, covered by thick callus, save for the papilliform apex. Aperture with widest point posterior to midline, more or less parallel-sided and obliquely curved anterior to this, posterior angle strongly constricted in adults; siphonal canal relatively wide, very shallowly notched. Columella pillar oblique, 0,47–0,58 length of labium, with gently convex lip; lirae 2–8 (3–5 in 79% of sample N = 75), subequal in strength, basal sinus deep. Paries straight or gently convex, covered by callus, which forms a dense pad at posterior end of aperture; inner face of paries sometimes with a shallow 'scar'. Ancillid groove shallow, forming a weak denticle on labrum and commencing on paries at the posterior end of the aperture; ancillid band almost flush with adjacent surface, 0,42–1,00 width of fasciolar band at labium; posterior fasciolar groove shallow. Microshagreen sculpture very fine, extending onto ancillid band. Labrum thick, particularly posteriorly where it is markedly to strongly incurved, concave and slightly prosocline in side view.



Figs 152–156. *Ancilla* species, base of body whorl. 152, *A. fasciata* (Reeve, 1864); 153, *A. marmorata* (Reeve, 1864); 154, *A. albozonata* E. A. Smith, 1904; 155, *A. ovalis* (Sowerby, 1859); 156, *A. castanea* (Sowerby, 1830).

Teleoconch whorls three. Protoconch (Fig. 56) narrowly domed, about 1½ whorls, maximum diameter 1,0–1,9 mm.

Colour light brown to medium orange-yellow, with a darker band in sutural region and another covering the ancillid band; subsutural region with a white band, sometimes diffusing outwards, fasciolar band and ancillid groove white; columella pillar tinged with various shades of brown; aperture light brown to light orange-yellow; protoconch white. Rarely uniform pure white overall.

Operculum transparent yellowish, leaf-shaped with excentric, anterior nucleus; surface with coarse growth lines and distinct radial striae; total length 0,29–0,34 of aperture (sometimes absent).

Radula (Fig. 157) with tricuspidate rachidians, median cusp longer than side ones, intermediary denticles small. Number of rows about 77.

Distribution: South coast of Cape Province, Republic of South Africa, to western Transkei.

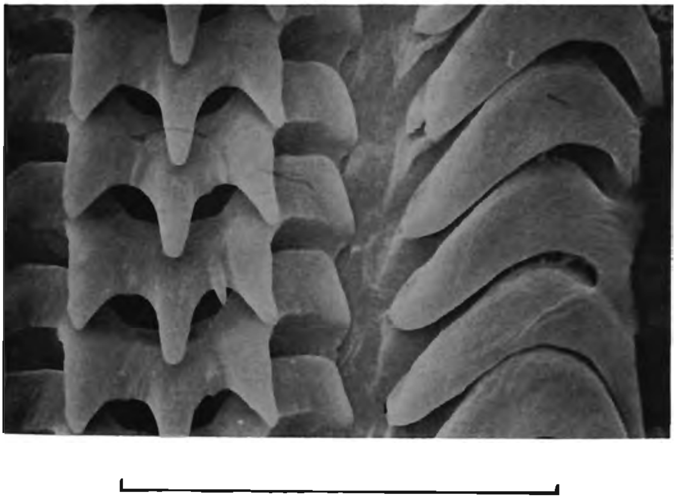


Fig. 157. *Ancilla albozonata*, SEM photograph of portion of air-dried radula; scale line = 0,1 mm.

Material examined: CAPE PROVINCE: off Cape Point, 32 fath. (SAM A30769: one, live); False Bay, dredged (NM Z1542: Mrs C. M. Connolly, four); off Simonstown, dredged (NM A1539: Connolly, numerous); off Walker Point, 40 fath. (SAM A1791: one); off Cape Infanta, 43 fath. (SAM A1873: two); off Cape St Blaize (NM A2909: R. Le Maitre, *ex pisce*, three); same, in 53 fath. (SAM A1867: one) and 42 fath. (SAM A1793: two); Jeffreys Bay (NM 8152, 9234, B3140: R. K., eleven; NM A2407: C. Connolly, numerous; B3336: H. Burnup, six; B1772: B. J. Young, two); Port Elizabeth (NM B3337: H. Burnup, three; B3341: W. Falcon, four; NM A5637: F. Graeve, thirteen, harbour dredgings); Algoa Bay, 67 fath. (SAM A1799: one) and Port Alfred (NMB3335: ex Albany Mus., twenty-one; NM 8161: R. K., one; NM B1770: B. J. Young, one; SAM A6836: three); East London (NM 5747: two, dredged off Buffalo Harbour, 80 ft; NM B1771: B. J. Young, two); Kwelera (NM A561: Mrs V. Armstrong, one); Bulugha (ELM 5080: five); Kei River Mouth (ELM 8173: Mrs H. Jeffreys, one). TRANSKEI: Nqabara (ELM: two); Umtata River mouth (ELM 8176: numerous).

Type material: Four syntypes of *Ancilla albozonata* are in the BM(NH) collection, No. 1903.12.19.1797–1800; one, bearing a red dot, is the figured example. This specimen, which measures 19,3 × 9,7 mm, is here designated as lectotype. The holotype of *Ancilla ordinaria major* is in the Oxford University Museum.

Habitat: infratidal, in about 20–100 metres.

Taxonomy: Barnard (1959) incorrectly synonymised *A. albozonata* with *A. fasciata*. Actually it is the most distinctive of the three Cape *Ancilla* s.s., differing from both *A. fasciata* and *A. marmorata* in its larger size, thicker shell, straighter lip and (usually) posteriorly constricted aperture; the spire and paries are more heavily calloused, and the aperture is widest posterior to the middle; the ancillid band is narrower than in *fasciata* or *marmorata*, showing a mean width of only

0,60 of the fasciolar band (N = 74), instead of 0,98 and 0,92 respectively (N = 62 and 42).

Comparison of samples of *A. albozonata* from False Bay dredgings (N = 34) and eastern Cape beach drift (N = 40) indicates a tendency for the spire to be more acute in the former (mean angle 65° as against 82°) and the ancillid band wider (0,64 of fasciolar band instead of 0,57).

Ancilla marmorata (Reeve, 1864)

Figs 57, 147–150, 153, 158

Ancillaria marmorata Reeve, 1864: pl. 9, figs 32a, b; Weinkauff, 1878: 33, pl. 10, figs 5, 7 (after Reeve). Type locality unknown.

Ancilla marmorata; Sowerby, 1892: 16; Turton, 1932: 32; (*partim*) Barnard, 1959: 70, fig. 16(g); Kensley, 1973: 170, fig. 635.

Ancilla pura Sowerby, 1892: 17, pl. 1, fig. 15; Turton, 1932: 32. Type locality: Port Elizabeth.

Ancilla dimidiata (*non* Sowerby); Sowerby, 1892: 17; Turton, 1932: 32.

Diagnosis: Shell relatively thin, oblong, with flattened, slightly shouldered labrum, breadth/length 0,41–0,52; spire low to high, angle 51°–93°, lightly calloused; aperture large, 0,57–0,80 of total length, its greatest width median; paries without distinct callus or scar; columella pillar oblique, with 2–6 subequal

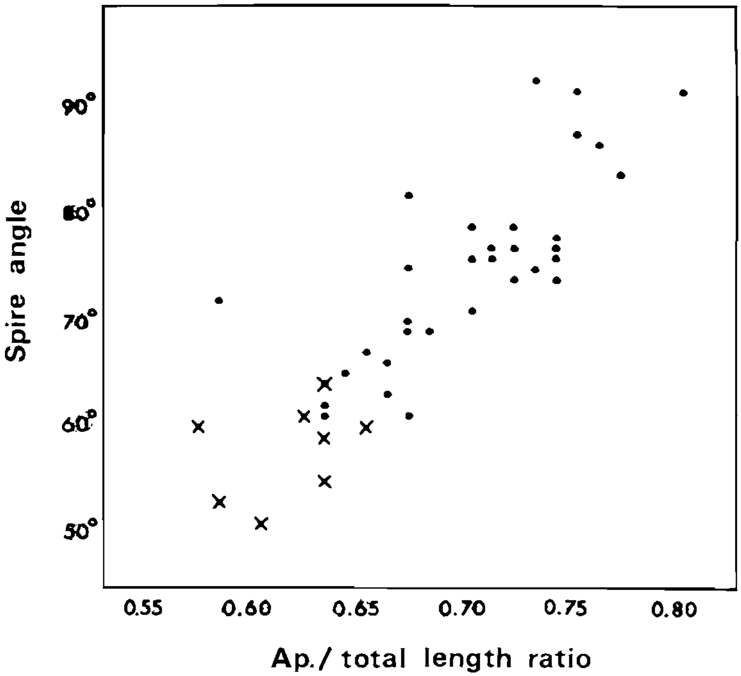


Fig. 158. *Ancilla marmorata*, scatter diagram showing correlation between spire angle and aperture/total length ratio. ● = typical form, ✕ = form *pura*. N = 32 and 8 respectively

lirae; ancillid groove shallow, well below end of aperture, denticle weak, ancillid band fairly wide, flush; microshagreen sculpture extending onto ancillid band. Flesh-colour to orange-brown with axial lines of colour, ancillid band and columella (and sometimes fasciolar band) darker brown; sometimes pure white overall. Maximum length nearly 26 mm.

Description:

Quantitative (N = 42):

Breadth/length: 0,41–0,52 (M = 0,48; SD = 0,03)
Aperture/total length: 0,57–0,80 (M = 0,67; SD = 0,12)
Spire angle: 51°–93° (M = 71,4°; SD = 10,7°)
Maximum length: 25,7 × 10,9 mm
Minimum adult length: 12,6 × 5,9 mm

Shell oblong, left side sometimes slightly more convex than right, labrum flattened and usually slightly shouldered; spire high to moderately low, lightly calloused, apex blunt, mamilliform or papilliform. Aperture relatively large, greatest width median, anteriorly curved and slightly tapering, posterior angle not strongly constricted; siphonal canal wide, not notched or only slightly so. Columella pillar oblique, 0,45–0,52 of total length of labium, margin convex, lirae weak, subequal, numbering 2–6 (3–5 in 95,3% of sample N = 42); basal sinus deep. Paries gently convex, without callus, ridge or scar. Ancillid groove shallow, forming a feeble tooth on lip, and commencing on paries at a level well below posterior end of aperture; ancillid band more or less flush with adjacent surfaces, 0,63–1,33 times width of fasciolar band; fasciolar groove shallow, fasciolar band slightly declivous. Microshagreen sculpture fine, extending onto ancillid band. Labrum thin, slightly incurved posteriorly, concave and slightly prosocline in side view.

Teleoconch whorls about three. Protoconch (Fig. 57) narrowly domed, 1,5 whorls, maximum diameter 1,4–2,0 mm.

Externally usually either moderate to deep orange, with darker and lighter axial hairlines, ancillid and fasciolar bands brownish-orange, or pale yellowish-pink with a white fasciolar band; columella strong brown to brownish-orange, aperture light to brownish-orange, protoconch white. Sometimes uniformly white overall.

Distribution: Republic of South Africa, from the eastern Cape Province to the north coast of Natal.

Material examined: CAPE PROVINCE: Jeffreys Bay (NM B3339: R.K., two; NM A2415: C. M. Connolly, twenty-three; NM B3359: E. K. Jordan, one, form *pura*; A2606; R.K. one, form *pura*; A2419: C. M. Connolly, nine, form *pura*); Algoa Bay (NM A2636: F. Graeve, four); Port Alfred (NM B3355: E. K. Jordan, one; NM 469: H. Becker, one; NM 467: H. Becker, one, form *pura*); Kwelera (NM A1540: C. M. Connolly, numerous); Gonubie (NM A1543: C. M. Connolly, eleven; NM A2416: C. M. Connolly, one, form *pura*). TRANSKEI: 'Pondoland coast' (NM B3360–3362: Mrs A. Filmer, thirty, form *pura*). NATAL: Port Shepstone (NM 471: H. C. Burnup, one); Scottburgh and Hibberdene (NM B1759, NM 470: H. C. Burnup, two, form *pura*); off Umdloti River, 40 fathoms (SAM A1822).

Type material: The faded holotype of *A. marmorata* from the Lombe-Taylor collection is in the British Museum (Natural History), No. 74.12.11.37; it measures 18,9 × 9,2 mm; the card is now marked 'S. Africa'. Two syntypes of *A. pura* are preserved in the same collection, No. 99.4.13.3685–3686; the larger measures 19,3 × 8,2 mm, the smaller 15,5 × 6,6 mm. The type locality for *A. marmorata* is here designated as Port Elizabeth.

Taxonomy: *A. marmorata* appears to be a dimorphic species, white shells showing a higher spire (angle 51°–64° against 62°–93°) than typical, coloured examples (see Fig. 158). Unfortunately only ten fresh examples of this white form (*pura* Sowerby, 1892) are available. Nevertheless apparent intermediates (eg. white shells with a pale brown columella and a moderately raised spire of angle 61°–63°) do occur. *Ancilla ordinaria* E. A. Smith, 1906, synonymised with *marmorata* by Barnard (1959), appears to be a white morph of *A. fasciata*.

Ancilla (Sparellina) ampla (Gmelin, 1791)

Diagnosis: Shell subcylindrical, width/length 0,36–0,45, spire rather papilliform or even mamilliform, acutely raised, angle 51°–84°, relative length of aperture 0,62–0,78, aperture widest posterior to middle, base moderately oblique with a wide, shallowly notched siphonal canal; ancillid band usually slightly declivous, 0,33–0,50 width of fasciolar band, labral denticle sharp; parietal region smooth, columella pillar long and narrow, with 2–9 weak to sharp pleats; uniform white (save sometimes for a rust-orange stain on spire) or pale orange-yellow; maximum length 36 mm.

Distribution: Coral Sea and Indonesia to Gulf of Aden.

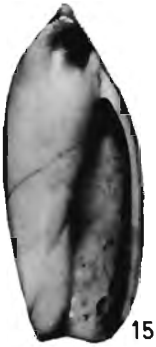
Taxonomy: *Ancilla ampla* is comprised of two sister populations, morphologically separable, which appear to have evolved vicariously on either side of the Bay of Bengal (Fig. 178). These are here treated as subspecies. *A. scaphella*, although superficially similar to *A. ampla*, has tricuspidate rachidian plates, not pectinate ones as (reportedly) in that species.

Ancilla ampla ampla (Gmelin, 1791)

Figs 52, 159–162, 168–169, 172, 177–180

Voluta ampla Gmelin, 1791: 3467 (type figure Martini, 1773: pl. 65, figs 722–724). Type locality unknown.
Bulla ampla; Dillwyn, 1817: 490.
Ancillaria ampla; Sowerby, 1859: 59, pl. 212, figs 26, 29; Reeve, 1864: pl. 8, fig. 27; E. A. Smith, 1891: 411; Martin, 1895: 68, pl. 9, figs 153, 153a.
Ancillaria (Sparellina) ampla; von Martens, 1903: 138.
Ancilla ampla; Troschel, 1869: 112, pl. 10, fig. 12 (radula, after Lovén); Satyamurti, 1952: 192, pl. 18, figs 5 a, b.
Ancillaria candida Lamarck, 1811: 304; *idem*, 1816: 1, pl. 393, figs 6a, b; *idem*, 1822: 414; Swainson, 1825: 225; Sowerby, 1830: 3, figs 5–7; Kiener, 1844: 25, pl. 5, fig. 4; Chenu, 1859: fig. 889. Type locality unknown.
Sparella candida; Gray, 1965: 36.
Ancilla (Sparella) cinnamomea (*non* Lamarck); Cossmann, 1903: 115, pl. 3, figs 14, 15.
Not *Ancilla (Sparellina) candida*; Cossmann, 1903: 115, pl. 3, fig. 17 (=*A. scaphella*).

Diagnosis: Shell relatively large (18–36 mm) and with either 5–8 columella lirae (white form) or 2–5 weak, rounded ones (orange form); microshagreen sculpture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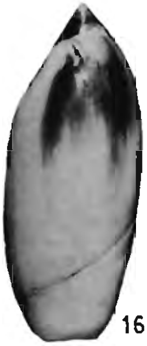
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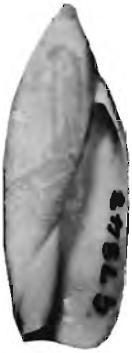

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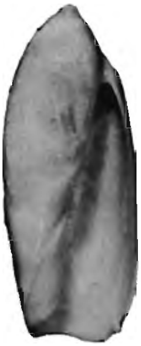
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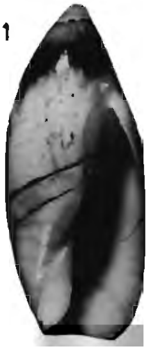
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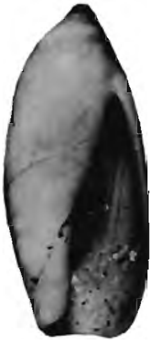
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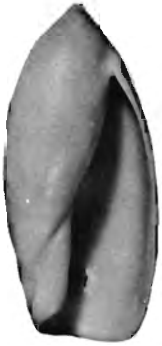
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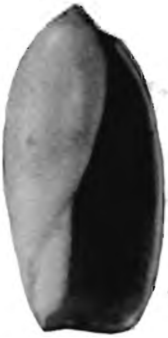
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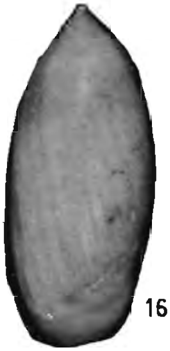
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Figs 159–167. *Ancilla ampla* (Gmelin, 1791) and *A. scaphella* (Sowerby, 1859). 159–162, *A. a. ampla*: 159, 160, White form Pondicherry, NM G7848, 26,0 × 10,7 mm; 161, Same data, 26,1 × 8,4 mm; 162, Orange form, Madras, NM G8699, 24 × 9 mm. 163, 164. *A. a. cylindrica* (Sowerby, 1859): 163, Port Blair, Andaman Islands, NM H9907, 12,7 × 5,5 mm; 164, Lombok, Lesser Sunda Is., 22 m, ZMC colln., 13,9 × 6,1 mm. 165–167, *A. scaphella*: 165, 167, Muscat, NM G4505, 33,3 × 15,0 mm; 166, Holotype, BM(NH) 197833, 25,3 × 11,9 mm, photograph courtesy BM(NH).

not extending beyond basal margin of fasciolar band; columella pillar 0,52–0,59 of labial length.

Description:

Quantitative (N = 112):

Breadth/length: 0,36–0,45 (M = 0,41; SD = 0,02)
Aperture/total length: 0,62–0,78 (M = 0,71; SD = 0,03)
Spire angle: 51°–84° (M = 65,7°; SD = 5,9°)
Maximum dimensions: 36 × 14,8 mm
Minimum adult dimensions: 18,1 × 7,8 mm

Shell subcylindrical, spire low, acutely orthoconic to shallowly coeloconic, apex sometimes rather papilliform or even mamilliform; left side of body whorl gently convex, labral side almost straight, greatest width at or just posterior to middle. Aperture with its greatest width also just posterior to its middle; anteriorly it is parallel-sided, posteriorly acutely tapering, labrum rather straight; base moderately oblique, siphonal canal wide, shallowly notched. Ancillid band slightly declivous to almost flush, flattened, 0,33–0,50 of width of fasciolar band at labium, latter gently convex, labral denticle distinct; anterior fasciolar groove fairly deep. Columella pillar long (0,52–0,59 of total length of labium), narrow and only moderately twisted, its labial margin rather straight; columella lirae either 4–9, thin and sharp, with the outer two often paired and separated from the rest by a fossa, or (orange form) 2–5 in number, blunt and weak to almost obsolete. Paries gently convex to slightly sinuous, covered by a milky callous glaze which fills extreme posterior angle of aperture; in juveniles sometimes with a weak 'scar'; labrum only thickened posteriorly. Surface with rather coarse growth lines, columella pillar and margin of siphonal notch microshagreened.

Teleoconch whorls about 2,5. Protoconch (Fig. 52) rather conical, 2 whorls, the first rather oblique; basal diameter about 1,3 mm.

Two colour forms: (a) uniform white, save frequently for an orange stain on right side of spire; (b) medium to light orange-yellow, darkest behind labrum, at termination of penultimate whorl and on base, columella pillar tinged with yellow.

Operculum unknown.

Radula with pectinate rachidians, intervals between the three main cusps wide, with four denticles (after Troschel).

Distribution (Figs 179, 180): North and west coasts of Bay of Bengal to Gulf of Aden.

Material examined:

(a) *White form:* SRI LANKA (USNM 107846: W. Dall, one; RSM: Traill, three; BM(NH): De Burgh, two; BM(NH) 1975 4.8.53: one; RSM: two); Trincomali (BM(NH): A. J. Peile, three; BM(NH) 1953.3.10.165–167: Winckworth, three). INDIA (RSM: Salisbury, four): Tuticorin (BM 1953.3.10.153–155: Winckworth, two); Manaar, 3 fath. (BM(NH) 1953.3.10.157: Winckworth, one); Kutikal Bay, Pamban (BM(NH) 1953.3.10.214–223: Winckworth, two); Karikal (IRSN: Dautzenberg, eight); Pondicherry (NM G7848: A. R. Bhagat, 1976, three; IRSN: Dautzenberg, six); Madras (BM(NH) 1953.3.10.156: Winckworth, one; BM(NH)

1953.3.10.158–164: Winckworth, three; MM: Henderson, one; BM(NH) 1953.3.10.123–124: Winckworth, two). Madras, dredged (BM(NH) 1953.3.10-.28- 31 and 18–24, Winckworth, five), and 5 fathoms (NMW: Melvill-Tomlin, three); Tranquebar (ZMC: nine); Waltair (USNM 622095: R. Nagabhuhanem, one); Chandipur (BM(NH) 1953.3.10.113–122, Winckworth, seven). BURMA: Arakan (BM(NH) 94.15.2219: Feddon, one). GULF OF ADEN: Aden or Obock (MHNP: Jousseaume, three); Aden (NM G5085: W. Falcon, one; RNHL: J. L. Staid, one; USNM 305713: Bendall, one; BM(NH) 1988.4.9.147, one); 12°00'36"N, 50°40'06"E, 91 metres (BM(NH): John Murray, Exped., one juvenile).
Locality erroneous or doubtful: 'Red Sea' (BM(NH): 74.1.2.40: Lombe-Taylor, one, fig. Reeve, pl. 27, fig. b; BM(NH): De Burgh, five; BM(NH): H. Cuming, three; NMW: Melvill-Tomlin, eleven; NM H9662: H. Becker, two; MHNP: Letellier, one; AMS: C52376, three; AMS C52780: Hargreaves, two; AMS C38461: three; RNHL: J. Mulder, two; HUJ 590: five).

(b) *Orange form:* INDIA: Tuticorin (BM(NH) 1953.3.10.153–155: Winckworth, one); Madras (NM G8699: P. Mukundan, 1977, six); South western India (AMS: C43958).
Locality erroneous or unknown: 'Red Sea' (NMW: Melvill-Tomlin, two; AMS: C52376: three); 'Zanzibar' (BM(NH) 1931.4.25.49.35: G. W. Young, seven). 'Loc?' (BM(NH): H. Cuming, one; IRSN: Dautzenberg, one).

Literature records: INDIA: Pamban, Krusadai Island and Kundugal Point, Gulf of Manaar (Satyamurti, 1952).
Erroneous: 'Mauritius' (Sowerby, 1830); 'Philippines' (Sowerby, 1859); 'Muscat, Oman, 10 fathoms' (Melvill & Standen, 1901, probably based on *A. scaphella*); 'Mahé, Seychelles' (Taylor, 1969, based on *A. sarda*).

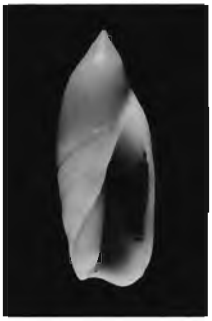
Fossil records: PLIOCENE: Karikal, S.E. India (Cossmann (1903) as *A. cinnamomea*); Menengteng gorge, Java (Martin, 1895).

Type material: The location of the material upon which the type-figure (the '*Voluta basiconstricta* f. *coarctata*' of Martini, 1773, pl. 65, fig. 722, here restricted) was based, is unknown (Martini's figures 723–724 evidently show *Ancilla ventricosa fulva* or, possibly, *A. castanea*). The holotype was in Martini's collection, now lost; although one of a set of nine from Tranquebar in the ZMC could conceivably be the original of the Martini figure, certainty is impossible; it measures 32 × 12,8 mm, with a spire angle of 65°. The type locality for *A. ampla* is here designated as Tranquebar, south-eastern India.

The probable holotype of *Ancillaria candida* Lamarck, 1811, is in the MHNG, Reg. No. 1104/73 (Figs 168, 169).

Habitat: Recorded as burrowing in clean or muddy sand, from low spring tide to about ten metres. Mean sea-temperature over most of its range 25°–30° C, salinity 25–36,5‰.

Taxonomy: *A. ampla ampla* appears to be a dimorphic taxon, consisting of a white form with 4–9 sharp columella lirae (mean 6,1), and a pale orange one (Fig. 172a) with 3–7 rounded, often weak lirae (mean 4,5). The frequency



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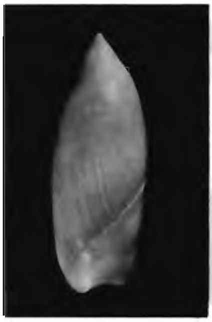

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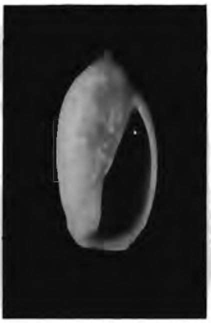

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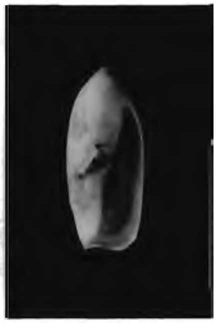

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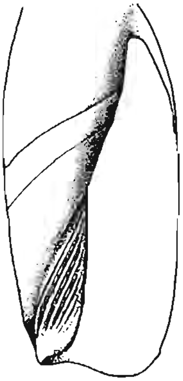
Figs 168–171. *Ancilla ampla* and *A. tronsoni*. 168, 169. *A. a. ampla*: holotype of *Ancillaria candida* Lamarck, 1811, MHNG 1104/73; length 30,2 mm. 170. *A. tronsoni*, presumed holotype, BM(NH) 197939, 12,1 × 6,3 mm. 171, *A. a. cylindrica*, holotype, BM(NH) 197936, 11,0 × 4,8 mm. Photographs courtesy MHNG and BM(NH).



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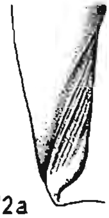

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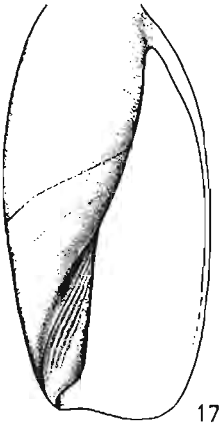

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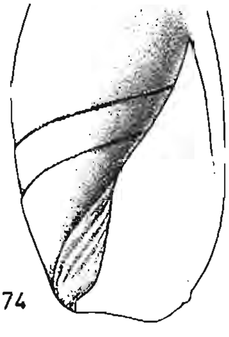

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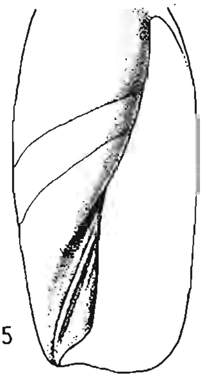

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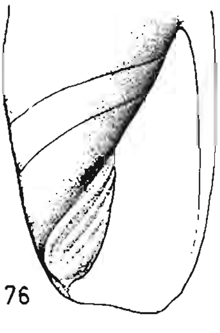

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Figs 172–176. *Ancilla* species, base of body whorl. 172, *A a. ampla* (Gmelin, 1791) (172a, orange form); 173, *A. scaphella* (Sowerby, 1859); 174, *A. thomassini* sp. n.; 175, *A. taylori*, sp. n.; 176, *A. sticta* sp. n.

distribution of these lirae is shown in Fig. 177. In addition, the white form often shows deep brownish-orange blotches in the spire region. Otherwise no differences are discernible between the two. However, field studies have yet to be undertaken, and it is not known whether the two morphs are sympatric or ecologically separated.

Little can be said about the widely-isolated Gulf of Aden population, as the locality datum on most specimens labelled 'Aden' is suspect.

The reported presence of a pectinate rachidian plate in *A. ampla* needs to be confirmed.

Ancilla ampla cylindrica (Sowerby, 1859)

Figs 163–164, 171, 177–179

Ancillaria cylindrica Sowerby, 1859: 58, pl. 212, figs 18, 19. Type locality: 'China Seas.'
Ancillaria ampla (*non* Gmelin); Reeve, 1864: pl. 11, fig. 46 (holotype); von Martens, 1887: 185.
Ancilla ampla; Schepman, 1911: 256.
Ancilla scaphella (*non* Sowerby); Schepman, 1911: 256.

Diagnosis: Shell small (adult length not exceeding 16 mm) and with only 3–5 columella lirae; microshagreen sculpture extending onto ancillid band and sometimes beyond; columella pillar 0,44–0,52 of labial length; colour white.

Description:
Quantitative (N = 42):
Breadth/length: 0,39–0,44 (M = 0,42; SD = 0,01)
Aperture/total length: 0,61–0,73 (M = 0,67; SD = 0,03)
Spire angle: 55°–72° (M = 61,4°; SD = 4,3°)
Maximum dimensions: 15,7 × 6,3 mm
Minimum adult dimensions: 10,1 × 4,3 mm

Shell as in *A. ampla*, but smaller (mean of 42 examples = 12,6 mm); columella lirae 3–5 (mean 3,79), narrow and fairly sharp; columella pillar shorter (0,44–0,53 of labium); microshagreen sculpture more or less covering fasciolar and ancillid bands, and sometimes showing on median area. Colour white, spire usually blotched with strong brown.

Distribution (Fig. 179): Andaman Islands and Mergui Archipelago to Indonesia and the Coral Sea east of Queensland.

Material examined: ANDAMAN ISLANDS (RSM: Salisbury, thirteen): Port Blair (NM F5669: Mrs & Miss E. M. Man, six; BM(NH) 1953.3.10.32–41, 62–71, 90–99, 143, 55–61: Winckworth, eighteen plus juveniles; BM(NH) 1953.3.9.506–515: Winckworth, two; BM(NH) 1881.10.6.6–9: Wilmer, three); Aves Is (BM(NH) 1953.3.10.86: Winckworth, one juvenile). MERGUI: Owen Is (BM(NH) 1887.3.10.338: Anderson, one). JAVA: Madura Bay, 69–91 metres, fine grey sand, coarse sand with shells and stones (ZMA: Siboga Exped., one). LESSER SUNDA ISLANDS: Pidjot, Lombok Is, 22 metres, mud, coral and coral sand (ZMA: Siboga Expedition, one); Bima Bay, Sumbawa Island, 55 metres, mud with patches of fine coral sand (ZMA: Siboga Exped. one); bank between Bahuluwang and Tambolongang Island, south of Selayar Island, 8–10 metres, with dead coral, etc. (ZMA: Siboga Expedition, one). AUSTRALIA: off

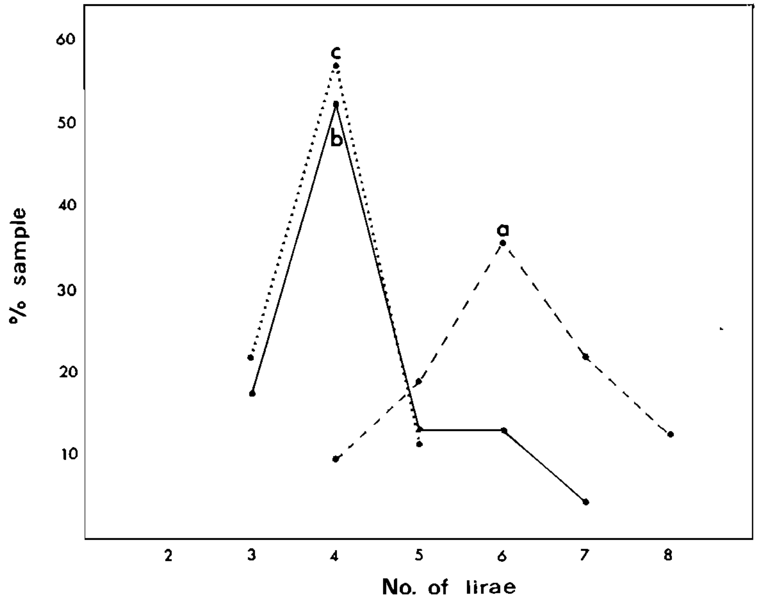


Fig. 177. *Ancilla ampla*, frequency distribution of columella lirae. a = *A. a. ampla*, white form (N = 64); b = *A. a. ampla*, orange form (N = 23); c = *A. a. cylindrica* (N = 44).

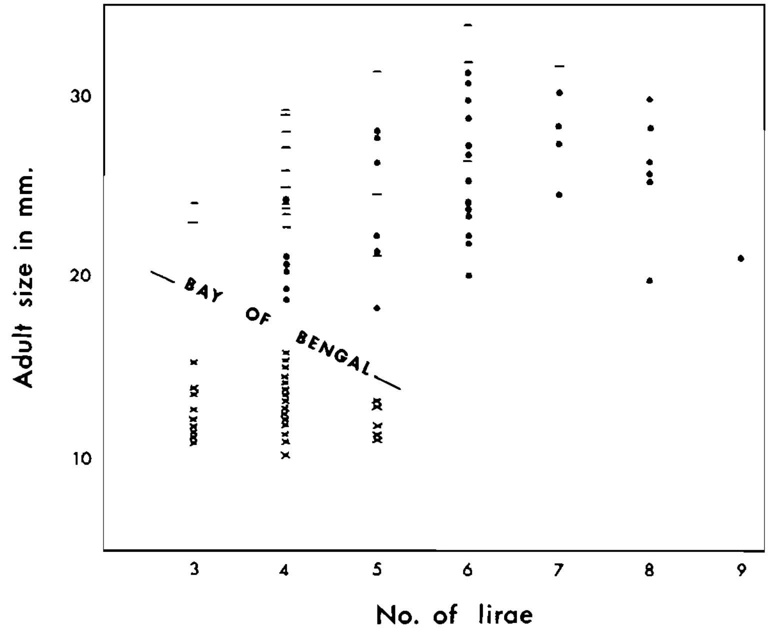


Fig. 178. *Ancilla ampla*, relationship between adult length and number of columella lirae. ● = *A. a. ampla*, white; — = *A. a. ampla*, orange; X = *A. a. cylindrica*. N =64, 23 and 42 respectively.

Raine Island, Queensland, 135–155 fath., coral sand (BM(NH): Challenger Exped., St. 185, one).

Literature records: MERGUI: 'Sullivan Island, 4 fathoms' (von Martens, 1887: 185).

Type material: The holotype of *Ancillaria cylindrica* (Fig. 171) is BM(NH) Reg. No. 197936, H. Cuming collection. The given type locality of 'China Seas' is here emended to Indonesia.

Taxonomy: Previous writers have treated *Ancillaria cylindrica*, the holotype of which measures only 11 × 4,8 mm, as the juvenile state of *Ancilla ampla*. Although the holotype is certainly immature, it agrees very well with Siboga specimens from Indonesia, and the name is here applied to the distinctive eastern population of *ampla* with some confidence. The Siboga specimen recorded by Schepman as *A. scaphella* is actually a malformed *ampla cylindrica*, in which the labrum is attached at the penultimate suture, giving a superficial resemblance to certain species of the marginellid genera *Hyalina* and *Volvarina*.

Ancilla (Sparella) scaphella (Sowerby, 1859)

Figs 165–167, 173, 180–181

Ancillaria scaphella Sowerby, 1859: 58, pl. 212, figs 37, 38; Reeve, 1864: pl. 8, fig. 26; Weinkauff, 1878: 39, pl. 12, figs 5, 6 (after Reeve). Type locality: 'Red Sea' (erroneous).
Ancilla scaphella; Satyamurti, 1952: 193, pl. 18, fig. 7.
Ancilla (Sparellina) candida (*non* Lamarck); Cossmann, 1903: 115, pl. 3, fig. 17.

Diagnosis: Shell ovate-cylindrical, width/length 0,45–0,49, spire low, rather bluntly mamilliform, angle 76°–91°, relative length of aperture 0,74–0,85 mm; aperture wide, particularly basally, base oblique with a shallow siphonal notch; ancillid band flush, 0,70–0,90 width of fasciolar band at labium; columella pillar long and narrow, with 3–5 rather weak, rounded pleats; uniform white (rarely with a brownish orange tinge above sutures or over spire); maximum length 33 mm.

Description:
  Quantitative (N = 10):
    Breadth/length: 0,45–0,49 (M = 0,47; SD = 0,01)
    Aperture/total length: 0,74–0,85 (M = 0,79; SD = 0,03)
    Spire angle: 76°–91° (M = 83,0°; SD = 5,2°)
    Maximum dimensions: 33,3 × 15,4 mm
    Minimum adult dimensions: 19,9 × 9,2 mm

Shell ovate-cylindrical, sides of body whorl moderately convex, greatest width more or less median; spire low-conical, its profile orthoconic to shallowly coeloconic, apex somewhat mamilliform, exposed, remaining sutures masked by a callus glaze. Aperture as in *A. ampla*, but proportionally wider, particularly basally, and labrum is more curved; base slightly more oblique and siphonal notch shallower than in *ampla*. Ancillid band flush with adjacent surfaces and curved in same profile, 0,70–0,90 width of fasciolar band at labium; ancillid groove very shallow, labral denticle small; fasciolar band rather ill-defined, gently curved, anterior fasciolar groove fairly deep, posterior one very shallow. Columella pillar as in *A. ampla*, but slightly shorter (0,47–0,52 of labial length) and anteriorly more obliquely truncate, pleats rather weak, rounded, 3–5. Paries gently convex

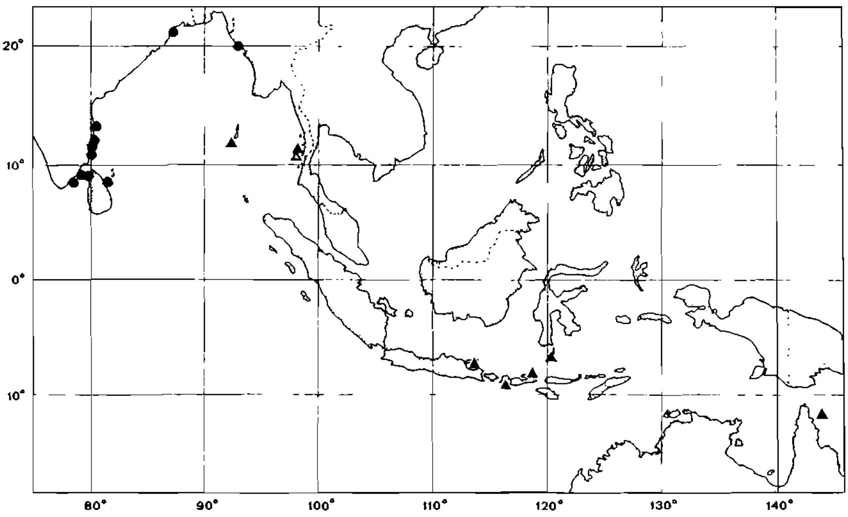


Fig. 179. *A. ampla*, distribution (Aden population not shown). ● = *A. a. ampla*. ▲ = *A. a. cylindrica*.

with an inconspicuous callus glaze, partly filling extreme posterior angle of aperture; labrum rather thin. Surface as in *A. ampla*.

Teleoconch whorls about 3; protoconch (Fig. 54) similar to that of *ampla*, but lower and more domed, basal diameter about 1,5 mm.

Colour white, occasionally with a pale brownish-orange tinge above suture or over whole spire.

Operculum unknown.

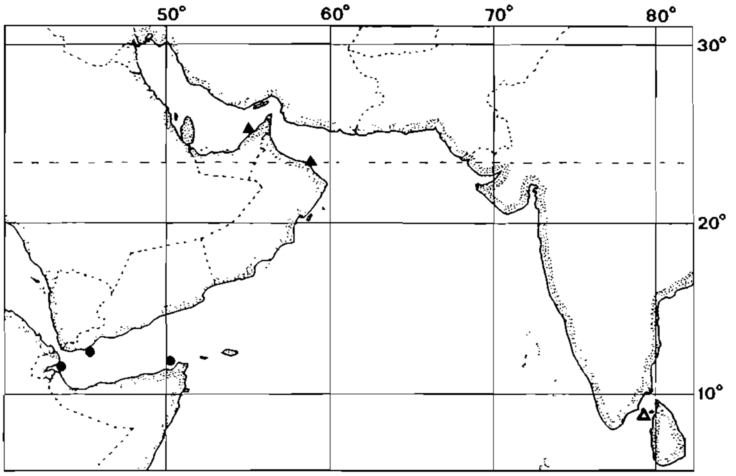


Fig. 180. *Ancilla scaphella* and *A. ampla ampla* (Aden population), distribution. ● = *A. a. ampla*; ▲ = *A. scaphella*; △ = *A. scaphella*, literature record.

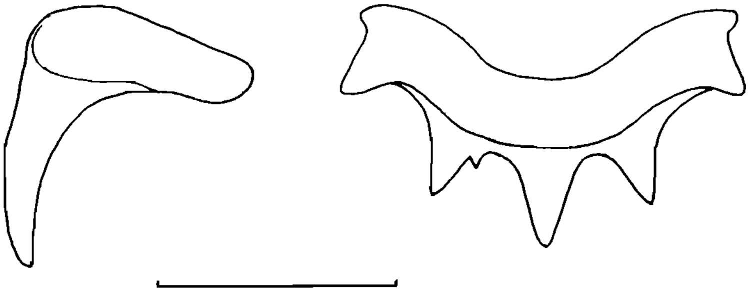


Fig. 181. *Ancilla scaphella*, camera lucida drawing of radula, Muscat; scale line = 0,1 mm.

Radula (Fig. 181) with about 85 rows of plates; rachidian plates with three strong cusps, the median strongest, intermediary cusps vestigial.

Distribution: Southern Persian Gulf and Gulf of Oman, also reported from south-eastern India.

Material examined: SULTANATE OF OMAN: Muscat (NM: F8715: R. Luther, three; NM G4505: D. Bosch, ten). TRUCIAL STATES: Dubai (Mrs K. Smythe collection, two).

Literature records: INDIA: Krusadai Island, Gulf of Manaar, 'dredged alive' (Satyamurti, 1952).

Fossil records: PLIOCENE: Karikal, S.E. India (Cossmann, 1903).

Erroneous records: Flores Island, 69–91 m (Schepman (1911), based on *A. ampla cylindrica*).

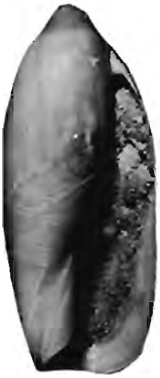
Type material: The holotype, which measures 25,3 × 11,9 mm, is in BM(NH) Reg. No. 197833 (Fig. 166). The given type locality of 'Red Sea, Earl Mountnorris' has never been confirmed and is here emended to Muscat, Gulf of Oman.

Taxonomy: *Ancilla scaphella* is very similar to *A. ampla ampla*, but is consistently broader (breadth/length ratio 0,45–0,49 as against 0,36–0,45) and has in general a markedly lower spire (aperture/total length 0,74–0,85 against 0,62–0,78); the ancillid band is wider (0,70–0,90 width of fasciolar band rather than 0,33–0,59 as in *ampla*) and more flush, and the base is wider and slightly more oblique, with a shallower siphonal notch. It is evidently a rare species, and is seldom seen in museum collections.

Ancilla taylori sp. n.

Figs 53, 175, 182–184

Diagnosis: Shell cylindrical breadth/length 0,42–0,43; with low, blunt, broadly mamilliform spire, angle 71°–80°, aperture/total length 0,79–0,82; aperture narrowly lanceolate; columella rather straight and narrow with two lirae on outer side; paries without callus, in juveniles with a 'scar'; ancillid groove deep, not forming a denticle; fasciolar and ancillid bands roughly microshagreened, median and posterior part of body whorl with dense, finely crispate axial threads; uniform white. Maximum length about 15 mm.



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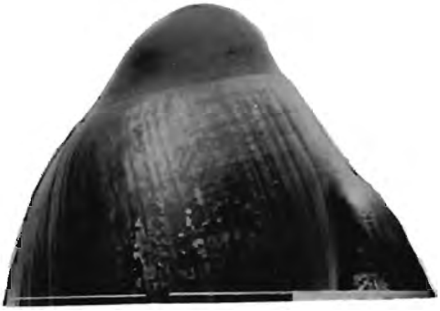

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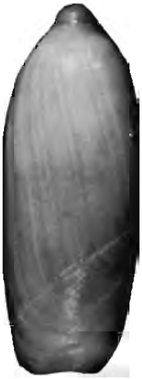

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Figs 182–184. *Ancilla taylori* sp. n. 182, 184, Holotype, BM(NH), 11,8 × 5,0 mm; 183, SEM photograph of adapical end, showing crispate sculpture, scale line = 1 mm.

Description:

Quantitative (N = 3 unless otherwise stated):

Breadth/length: 0,42–0,43 (N = 2)
Aperture/total length: 0,79–0,82
Spire angle: 71°–80°
Maximum dimensions: length 15,4 mm (lip broken)
Minimum dimensions: 8,8 × 3,8 mm

Shell cylindrical with a broad base and low, broadly mamilliform spire; body whorl with equally convex sides, greatest width median, spire covered by a thin callus glaze, exposing protoconch. Aperture narrowly lanceolate, greatest width median, anteriorly parallel-sided, posterior end acute; siphonal canal wide, shallowly notched. Columella pillar rather straight, narrow, 0,48–0,51 length of labium, its lip only slightly convex; lirae two, subequal, situated on outer half of pillar; basal sinus very indistinct. Paries slightly convex, without callus, in juveniles with a distinct 'scar' in region of ancillid/fasciolar bands. Ancillid groove deep, its bottom rendered pliculate by growth lines, labral denticle feeble or absent; ancillid band wide (0,60–0,86 of fasciolar band at labium), almost flush; fasciolar band slightly declivous, flattened; anterior fasciolar groove wide. Median and posterior part of body whorl densely covered by finely crispate axial threads; fasciolar and ancillid bands and columella roughly microshagreened, as is the callus deposit posterior to aperture. Labrum thin, slightly incurved posteriorly, with a notch-like anal canal; in side view concave and slightly prosocline. Uniform white.

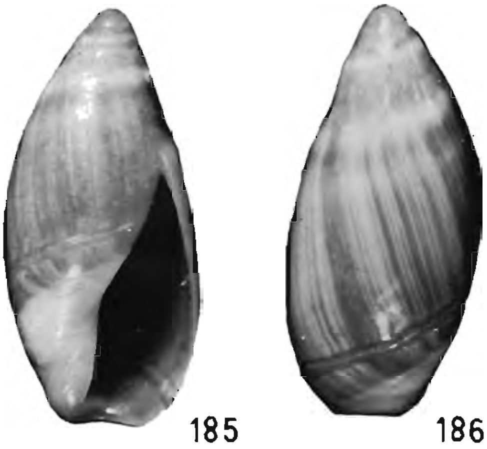
Teleoconch whorls two. Protoconch (Fig. 53) domed, of two whorls, the first tilted and slightly projecting; termination marked by a varicoid ridge; maximum diameter 1,6–2,1 mm.

Distribution: Brunei-Sabah Shelf in South China Sea.

Type material: Holotype, off Sabah (North Borneo), 5°52'N, 115°18'E, 28 fathoms (BM(NH): HMS Dampier, 1963, Station 95); dimensions 11,8 × 5,0 mm. Paratype 1, same locality data; paratypes 2–3, 5°59'5"N, 115°15'00"E, 38 fathoms (BM(NH): HMS Dampier, Stn 94, two broken).

Habitat: dredged dead on fine sandy-mud [traces inside aperture] in about 50–70 metres, salinity 35,9–36,6‰ (Haile *et al*, 1964).

Taxonomy: This striking new species, named in honour of Dr John D. Taylor of the British Museum (Natural History), is unique within the genus on account of the crinkly axial ridges and conspicuous microshagreen sculpture. Unfortunately the only known specimens are empty shells.



Figs 185–186. *Ancilla thomassini*, holotype, B. Thomassin colln., 6,3 × 3,1 mm.

Ancilla (Sparella) thomassini sp. n.

Figs 58, 135, 174, 185–186

Diagnosis: Shell very small (up to 7 mm); oblong-fusiform (breadth/length 0,44–0,50), base contracted, spire moderately high, angle 46°–63°, blunt, aperture/total length 0,58–0,70; sutures distinct; ancillid groove deep, forming a distinct tooth, followed by a notch; ancillid and fasciolar bands declivous; columella pillar short, with 3–4 subequal lirae; pure white to pale orange-yellow with a white fasciole and a diffuse orange line below suture.

Description:
Quantitative (N = 32):
Breadth/length: 0,44–0,50 (M = 0,47; SD = 0,02)
Aperture/total length: 0,58–0,70 (M = 0,64; SD = 0,03)
Spire angle: 46°–63° (M = 56,5°; SD = 4,6°)
Maximum dimensions: 7,1 × 3,2 mm
Minimum adult dimensions: 4,6 × 2,2 mm

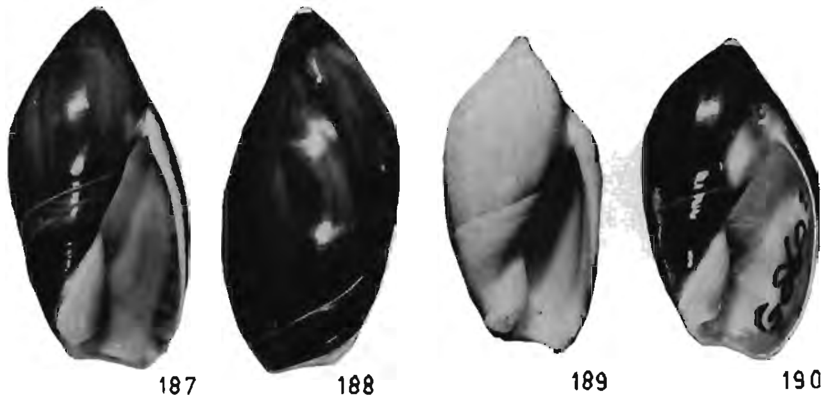
Shell oblong-fusiform, extreme base slightly to strongly contracted, greatest width median, left side of body whorl slightly more convex than right, labrum sometimes slightly shouldered; spire moderately high, usually orthoconic, sometimes slight coelo- or cyrtoconic, whorls slight convex, sutures masked by a callus glaze, but usually somewhat indented, particularly on right side just above termination of labrum. Aperture with greatest width just anterior to middle, acutely tapering posteriorly, curved anteriorly; siphonal canal wide, very shallowly notched, base almost straight. Columella pillar short, only about 0,45–0,51 length of labium, moderately twisted, its inner margin almost straight, with a shallow basal notch; lirae 3–4, fairly strong, subequal, the outer one demarcated by a slightly wider interval than the others. Paries gently convex, without a distinct callus, ridge or scar: Ancillid groove deep, terminating in a distinct labral tooth; ancillid band slightly declivous and rather wide, at labium subequal to fasciolar band in width; fasciolar band declivous, rather thick, flattened, anterior fasciolar groove shallow. Smooth, except for a few growth lines behind labrum, and very fine, indistinct microshagreen sculpture that is visible between columella pleats, along siphonal border of fasciole and along labral rim. Labrum fairly thick, often with a small notch anterior to labral tooth; in side view prosocline and almost straight.

Teleoconch whorls 2,5. Protoconch (Fig. 58) narrowly domed, 1,25 whorls, initial one rather large, maximum diameter 0,8 mm.

Either uniform white or light orange-yellow, with a diffuse darker orange line posteriorly, separated from suture by a series of faint, whitish blotches; fasciolar band and columella white.

Operculum transparent and almost colourless, surface with growth lines and faint radial striae; 0,61–0,68 of aperture length.

Radula with tricuspidate rachidian plate, main cusps rather small, median cusp longer than side ones, intervals rather wide, intermediary denticles sharp, 1–2 per side; lateral plates with a slender base and subequal uncinus.



Figs 187–190. *Ancilla castanea* (Sowerby, 1830). 187, 188, Masirah Island, NM G7933, 35,5 × 18,6 mm; 189, Cream colour form, Kuwait, G2680, 29,3 × 15,1 mm; 190, Persian Gulf, NM G8603, 25,6 × 15,4 mm.

Distribution (Fig. 135): Seychelles and Malagasy Republic.

Type material: MALAGASY REPUBLIC: Holotype (Figs 185, 186) in colln. B. Thomassin; Tulear, littoral (No. 790); 6,3 × 3,1 mm. Paratypes 1–19, same data. SEYCHELLES: Paratypes 20–45, IRSN, leg. R. Chirubin, beach drift; Paratypes 46–48, Mahé, IRSN, leg. R. Chirubin; Paratypes 49–50, NM H9674/T2473: R. C. Woods.

Taxonomy: *A. thomassini* is the smallest known *Ancilla*. Most of the types were picked out of a large sample of *Ancilla sarda* identified by Dautzenberg as *A. lineolata*. *A. thomassini* is smaller and more asymmetrical than *lineolata* and its more distinctly declivous ancillid band and contracted base also help to distinguish it. Seychelles material differs from that of Madagascar in being colourless and in the ancillid groove forming a deep notch behind the lip.

Ancilla (Sparella) castanea (Sowerby, 1830)

Figs 14, 20–22, 59, 187–194

Ancillaria castanea Sowerby, 1830: 5, figs 20–23; *idem*, 1859: 60, pl. 214, figs 76–79; Reeve, 1864: pl. 6, fig. 17; Weinkauff, 1878: 27, pl. 8, figs 6, 7; Shopland, 1902: 173. Type locality: 'Indiae Orientalis'
Ancilla castanea; Melvill & Standen, 1901: 427; Melvill, 1928: 110.
Ancillaria deshayesii (A. Adams M/S) Sowerby, 1859: 60, pl. 214, figs 68–69; Reeve, 1864: pl. 7, fig. 23; Weinkauff, 1878: 31, pl. 9, fig. 8 (after Reeve) (**syn. n.**). Type locality: Red Sea.
Ancilla cinnamomea (*non* Lamarck); Biggs, 1973.
Ancilla ventricosa (*non* Lamarck); Swainson, 1825: 279; Kiener, 1844: 20, pl. 6, fig. 3.

Diagnosis: Shell oblong-ovate, breadth/length 0,48–0,60; body whorl rather swollen, often with a slight suggestion of a shoulder, spire varying in height, angle 65°–93°, aperture/total length 0,61–0,74, base somewhat oblique, ancillid band present, labral denticle sharp; columella pillar strongly twisted, with 3–6 rather weak lirae, of which the outer 1–2 may be separated by a slight fossa, microshagreen sculpture very faint; colour more or less uniform, varying from dark brown to yellowish-white or deep orange-yellow; maximum length about 38 mm.

Description:
Quantitative (N = 70):
Breadth/length: 0,48–0,60 (M = 0,53; SD = 0,02)
Aperture/total length: 0,61–0,74 (M = 0,66; SD = 0,03)
Spire angle: 65°–93° (M = 79,1°; SD = 6,4°)
Maximum dimensions: 37,6 × 20,4 mm
Minimum adult dimensions: 23 × 13,1 mm

Shell oblong-ovate, greatest width posterior to middle, body whorl strongly tumid, often with a slight suggestion of a rounded shoulder; spire orthoconic, or slightly cyrto- or coeloconic, height variable, apex somewhat papilliform, sometimes mamilliform; sutures visible, although covered by a thin callus deposit. Aperture similar to that of *A. ventricosa*, labrum gently curved; base somewhat oblique, siphonal canal wide but shallowly notched. Ancillid band either slightly declivous, flat or a little concave, 0,40–0,89 width of fasciolar band at labium, fasciolar band moderately convex; labral tooth short but sharp. Columella pillar

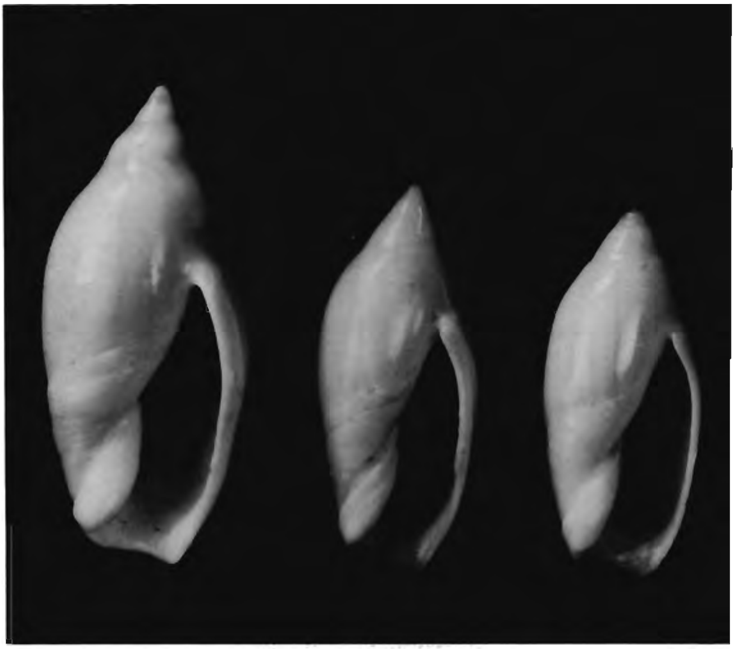


Fig. 191. *Ancilla castanea*, holotype of *Ancillaria deshayesii* Sowerby, 1859, BM(NH) 197835, 31,4 × 14,7 mm (left hand shell only; two right-hand shells are *A. acuminata*, not part of type material). Photograph courtesy BM(NH).

strongly twisted, its inner margin convex, separated from fasciolar band by a deep groove; basal notch deep and fairly wide; pillar bears 3–6 weak, oblique lirae, of which the outer 1–2 may be separated by a slight fossa. Paries gently convex to almost straight, and with at most a feeble parietal ridge, parietal callus ill-defined, filling posterior angle of aperture. Labrum slightly inflexed and only moderately thickened, particularly posteriorly. Surface with faint growth lines and occasionally traces of faint and irregular spiral striations; microshagreen sculpture very weak, restricted to columella pillar and anterior fasciolar groove.

Teleoconch whorls about 2,5, protoconch narrowly domed, of about 1,5 whorls, last whorl overlapped by callus, diameter 2,0–2,2 mm.

Colour varying from dark brown through paler shades to yellowish-white, or pale to deep orange-yellow; uniform, except sometimes for irregular darker or lighter axial streaks; ancillid groove sometimes paler, and sutural callus sometimes darker than ground colour; protoconch and columella pillar whitish, except in dark shells where the pillar is tinged with brown; aperture paler than exterior.

Operculum absent (N = 5 bodies examined).

Radula (Fig. 194) with tricuspidate rachidian, median cusp slightly stronger than side cusps, intermediary denticles weak, 0–2 per side; lateral plates with short uncinus and large base. About 40 rows.

Distribution (Figs 192, 193): Northern Gulf of Aden to north-western India and the Persian Gulf.

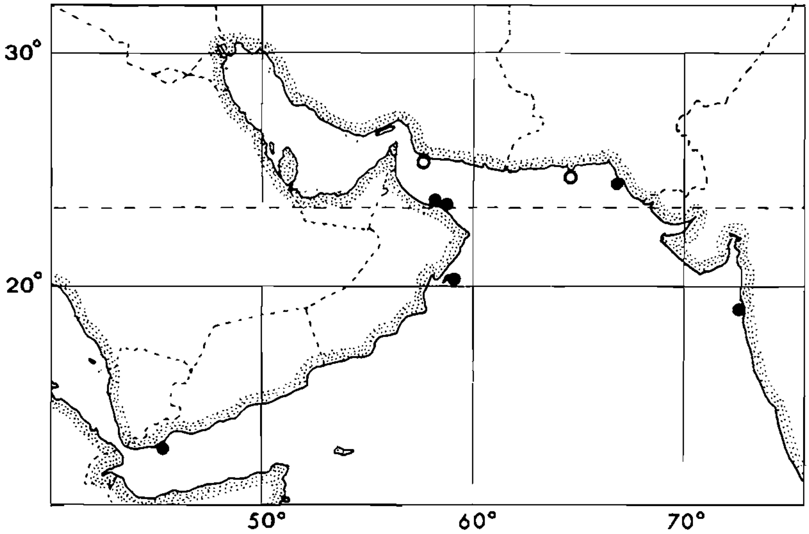

30°
20°
50°
60°
70°

Fig. 192. *Ancilla castanea*, distribution (excluding Persian Gulf): circles represent literature records.

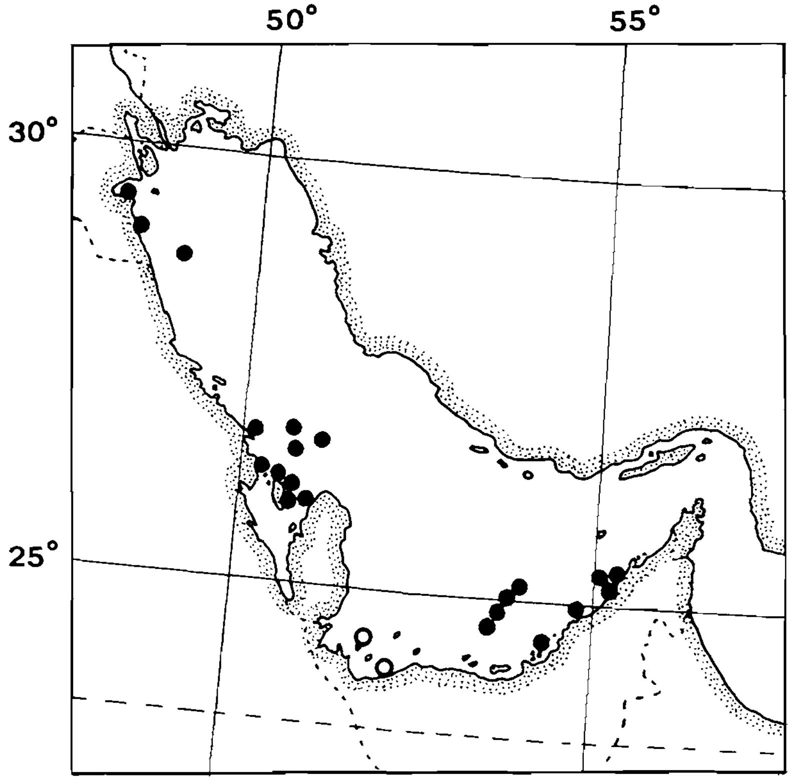


Fig. 193. *Ancilla castanea*, distribution within Persian Gulf.

Material examined: ADEN: BM(NH) 1902.10.10.28: D. C. Dinshaw, one; NM H9664: H. Becker, ex H. Fulton, one); Surf Beach, Aden (P. Cambridge colln, two worn) and Khor Maksar beach, Aden (BM(NH): H. E. J. Biggs, leg. P. Cambridge, one). PAKISTAN: Karachi (NMW: Melvill-Tomlin, seven; RNHL: H. Fulton, two; AMS C40135: C. Hedley, two). INDIA: Bombay (BM(NH): F. W. Townsend, one juvenile). SULTANATE OF OMAN: Muscat (NM G4506, G4504: D. Bosch, seventeen, living and dead; NM F8351: F. Luther, three; BM(NH): Townsend, two); Muscat, 15–28 fath. (NMW: Townsend, one); Mina al Fahal beach, ± 13 km west of Muscat (NM F8700: F. Luther, one); Masirah Island (NM G8333: M. Dixon, 1976, two; NM G7933: R. & P. Armes, one; BM(NH): Biggs, leg. P. Hall, 1969, one; D. Bosch colln., one). TRUCIAL STATES: Dubai (BM(NH): Biggs, leg. M. L. Nazer, 1970, one); Abu Dhabi Island (NM G2684: A. P. Dow, nine); Sharjah (BM(NH): Biggs, one; R. & P. Armes colln., one); off Khor-Fakkan, Sharjah, 16 fathoms (NM G7797: B. Lafferty, one); 24°45'15"N, 53°41'45"E, 11 metres, one; 25°01'30"N, 53°42'10"N, 23 metres, two; 24°47'30"N, 53°35'20"E, 16 metres, two; 24°47'30"N, 53°45'10"E, 7 metres, one (all RNHL: A. J. Keij). BAHRAIN: Bahrain Island (NM G1684: M. D. Gallagher, one; NM G2371: Mrs K. R. Smythe, one; BM(NH): Biggs, leg. C. M. Mamson, 1969, one); off Bahrain, 5 fathoms, coral sand (MM: Townsend, one); 30 mi. east of Bahrain, from gut of *Tetrodon* [= *Arothron*] *stellatus* (Bloch), caught in 17 metres (ZMC: G. Thorson, 1938, one); 26°50'00"N, 50°56'05"E, 29 metres, one; 26°27'00"N, 50°59'30"E, 14 metres, one; ca. 25°56'00"N, 50°51'30"E, 7 metres, four; 26°43'00"N, 50°54'20"E, 21 metres, one (all RNHL: A. J. Keij). SAUDI ARABIA: Ras Tanura (NM G2677: Mrs L. Johansen, seven, in sand at LST; BM(NH): Grantier, three; USNM 597601:

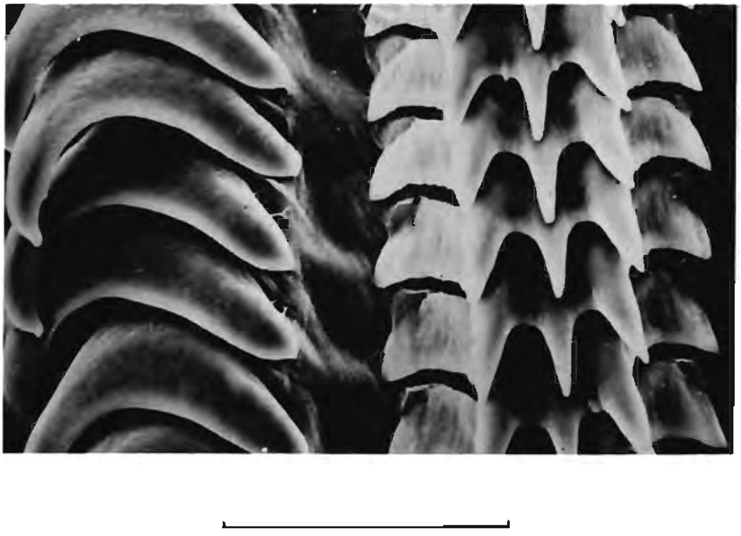


Fig. 194. *Ancilla castanea*, SEM photograph of air-dried radula, Muscat, scale line = 0,1 mm.

D. S. Erdman, three; RNHL 2363: Mrs A. Voorbrood, one); 28°32'40"N, 49°20'20"E, 35 metres (RNHL: A. J. Keij, one); Dahran (NM: Mrs Grantier, per Mrs S. D. Kaicher, one). KUWAIT: Al Kuwait (NM G2679: Mrs B. A. Glayzer, two, in sand over dead coral, LST; NM G2680: Mrs B. A. Glayzer, forty-one; USNM 618497: H. M. Symmes, eighteen, worn); 51 mi. S. of Mina-al-Ahmadi (BM(NH): Biggs, 1964, one).

Literature records: PAKISTAN: Ormara, amongst loose rocks and sandy mud, 7 fathoms (Melvill & Standen, 1901). TRUCIAL STATES: Jazirat as Sa'diyat, outer lagoon, Abu Dhabi; 32 km N.E. of Jazirat al Dalma, 16–18 m.; Shuweihat beach, west coast of Jebel Dhanna, N. Jazirat al Futaysi; Eastern Khor (all Biggs (1973), as *Ancilla cinnamomea*). IRAN: Jask (Melvill & Standen, 1901).

Erroneous records: 'Red Sea' (Sowerby, 1859); 'Dahlak' (Weinkauff, 1878); 'Moluccas' (Reeve, 1864, for *Ancillaria deshayesii*).

Type material: The types of *Ancillaria castanea* cannot be traced; the erroneous type locality of 'East Indies' is here amended to Muscat, Sultanate of Oman. The holotype of *Ancillaria deshayesii* (Fig. 191) is BM(NH) Reg. No. 197835, dimensions 31,4 × 14,7 mm; with it are two specimens of *Ancilla acuminata* (Sowerby, 1859), presumably added subsequently.

Habitat: *Ancilla castanea* chiefly inhabits waters with a salinity range of 35,5–44,5‰ (and probably higher) and a temperature range of 16°–34° C. It lives in colonies from low-tide level down to over 35 metres, generally in coral sand, rarely sandy mud, often on silting reefs or among boulders. Shell coloration does not appear to depend on substratum, both dark and light examples sometimes occurring in close proximity to each other (Mrs B. Glayzer, pers. comm.).

Taxonomy: *Ancillaria deshayesii* was based on a high-spired example of one of the pale colour forms. The various chromomorphs and their intermediates are sympatric at many localities, although there is a slight degree of geographic correlation. For example, only dark to deep brown individuals appear to be known in the Aden–Oman area, while in Kuwait the paler shades predominate, and in Abu Dhabi the yellower hues are the commonest. One abnormal example from Masirah (D. Bosch colln.) is deep yellowish-brown with two broad spiral bands of light yellowish-brown.

Remarks: *Ancilla castanea* appears to be the dominant ancillid in the southern Persian Gulf and may be very common locally, sometimes with a population density of up to a dozen individuals in less than five square metres (Mrs K. Smythe, pers. comm.). Curiously, no material has been seen from the entire Iranian coast; as there is only a single record from here, and that from Jask in the Gulf of Oman, it may prove to be absent from the northern coast of the Persian Gulf. The range of *A. castanea* does not appear to reach the Red Sea proper, and most examples seen from Aden are in a beachworn state, suggesting this locality to be near the western limits of the species. Such beach-rolled shells can be mistaken for the plump Aden/Kenya form of *A. ventricosa*, only the presence of an ancillid groove and tooth, and (as a rule) coloration, separating them.

Ancilla (Sparellina) ovalis (Sowerby, 1859)

Figs 63, 155, 195–202, 207–208

Ancilla ovalis Sowerby, 1859: 60, pl. 214, figs 82, 83; Reeve, 1864: pl. 10, fig. 40; Shopland, 1902: 173. Type locality unknown.
Ancillaria eburnea (*non* Deshayes); Sowerby, 1859: 61, pl. 214, figs 84, 85; Reeve, 1864: pl. 11, fig. 42.
Ancilla eburnea; Melvill & Standen, 1901: 427; Burch & Burch, 1958: 14; Biggs, 1972: 500; *idem*, 1973: 370.
Ancilla fasciata (*non* Reeve); Melvill & Standen, 1901: 427.
Not *Ancillaria ovalis*; von Martens, 1880: 262.

Diagnosis: Shell small (8–17 mm), fusiform-ovate to oblong-ovate, sides strongly convex, base typically narrow, spire angle 56–72°; ancillid band wide, more or less flush; columella pillar with 2–4 lirae, outermost strong, sometimes forming a slightly separate ridge; anterior fasciolar groove very shallow; labial tooth sharp and conspicuous. Colour uniform white to pale brownish-orange, sometimes with yellowish-brown spiral lines and bands, columella pillar often tinged with orange-brown.

Description:

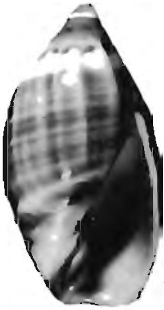
Quantitative (N = 120):

Breadth/length: 0,36–0,58 (M = 0,50; SD = 0,03)
Aperture/total length: 0,49–0,71 (M = 0,59; SD = 0,04)
Spire angle: 46°–78° (M = 62,7°; SD = 7,0°)
Maximum dimensions: 17,6 × 9,3 mm
Minimum adult dimensions: 5,0 × 2,7 mm

Shell typically oblong-ovate with strongly rounded sides and narrow base, but sometimes ovate-cylindrical; periphery of body whorl median or situated just posterior to middle; spire sharply orthoconic or very slightly coeloconic, but often cyrtoconic in deep-water individuals; apex slightly papilliform, spire whorls barely convex, sutures hidden. Ancillid band flattened, flush with adjacent surfaces (except sometimes for a slight ridge bordering the ancillid groove); its width is variable, ancillid band/fasciolar band ratio 0,38–1,28 (M = 0,65, SD = 0,18, N = 108); ancillid groove ending in a prominent denticle. Fasciolar band evenly curved, anterior fasciolar groove very slight. Columella pillar small (0,40–0,48 length of labium) not strongly twisted, with only 2–3 (rarely four) lirae, of which the outermost, which is strongest and separated slightly from the rest, may form a distinct fold where it crosses the labium; columella lip straight or gently convex. Aperture rather trigonal, acute posteriorly, evenly-rounded at labrum, anterior half more or less parallel-sided; siphonal canal wide, barely indented. Paries gently curved, normally calloused only in deep-water specimens, normally without a 'scar'. Columella pillar, back of labrum and external margin of siphonal canal very finely microshagreened. Labrum incurved posteriorly, rather thin and gaping anteriorly, edge straight and slightly prosocline.

Teleoconch whorls 3–4 in number. Protoconch (Fig. 63) of 1,5 whorls; maximum diameter 1,0–1,1 mm, shape as in *A. acuminata*.

Colour very variable; typically pure white or yellowish-white overall, but in Gulf of Aden is usually medium orange-yellow or light yellowish-brown, darker at sutures, with the basal callus and aperture moderate to strong orange, columella usually tinged with orange, the ancillid groove encompassed by a white line. In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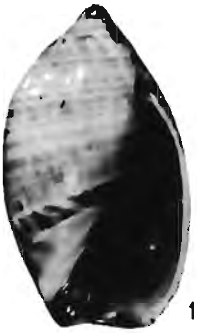
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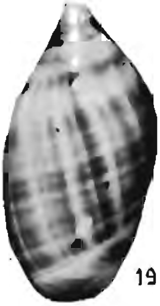
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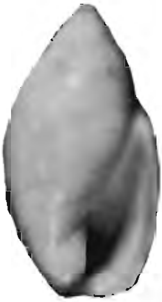
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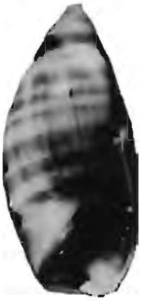
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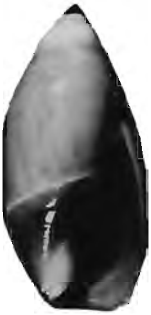
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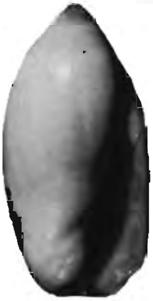
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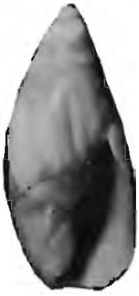
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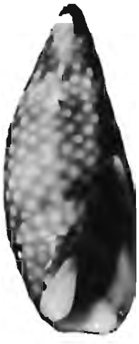
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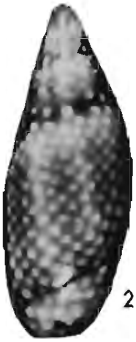
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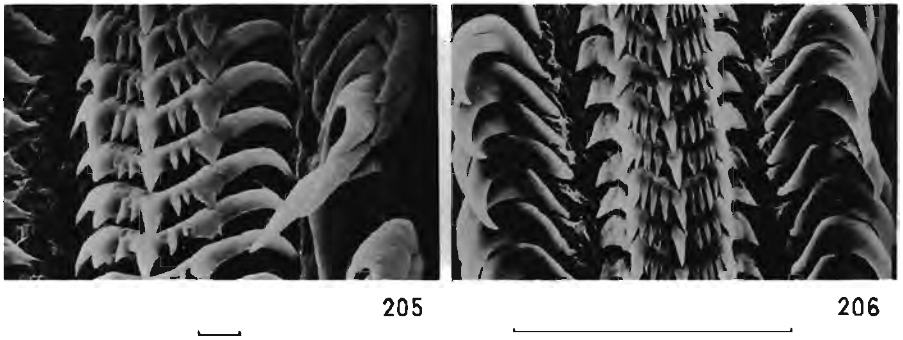
Figs 195–205 *Ancilla ovalis* (Sowerby, 1859) and *A. sticta* sp. n. 195–202. *A. ovalis*. 195, 197, Salamiah, Kuwait, NM G2691, 12,0 × 6,3 mm; 196, Muscat, NM H5696, 15,4 × 8,3 mm; 198, Neotype, NM H9967, Ras Ash Sha'm, Trucial Oman, 10,5 × 5,6 mm; 199, Salamiah, Kuwait, NM G2691, 10,9 × 5,1 mm; 200, Aden, NM G2692, 12,4 × 6,1 mm; 201, 202, off Henjam Island, BM(NH) colln., 8,4 × 3,6, 6,4 × 3,2 mm respectively. 203, 204. *A. sticta*, holotype, 12,7 × 5,1 mm.

Persian Gulf/Oman area usually patterned with spiral and axial lines of dark to moderate orange-yellow, ancillid band and subsutural region usually irregularly blotched with light brown, becoming darkest towards siphonal notch; columella pillar brownish-orange, this colour also showing inside base of aperture; ancillid groove as in Aden form.

Foot and mantle cream, flecked with light brown (Mrs K. Smythe, pers. comm. 1974).

Operculum transparent, yellowish, surface radially striate, varying in size from about 0,54–0,70 of aperture; sometimes absent.

Radula (Figs 205–206) with pectinate rachidian plates; median cusp longer than side cusps, with 2–4 sharp intermediary denticles; lateral plates hook-like. About 75 rows.



Figs 205–206. *Ancilla ovalis*, SEM photographs of air-dried radula. 205, Oblique view; scale line = 0,01 mm; 206, Transverse rows, line = 0,1 mm.

Distribution (Figs 207, 208): Southern Red Sea to Persian Gulf and India.

Material examined: SAUDI ARABIA (Red Sea coast): Jiddah (NM: Mrs M. Williams, two; Williams colln. fourteen). ETHIOPIA: (a) Eritrean mainland: Hawakil (Hauachil) Bay, 10–12 fathoms (TAU: ISRSE, 1965, five); Massawa (NMV: Jickeli, one); (b) Dahlak Archipelago: Museri Island (TAU: ISRSE, 1965, one; RNHL: L. B. Holthuis, 1965, two); 15°35′N, 40°40′E, 11–13 fathoms (TAU: ISRSE, 1965, one worn); Dahul Island (BM(NH): Biggs, one). GULF OF ADEN: Perim Island (BM(NH) 91.1.31.120–1 (part): J. J. Walker, one); Djibouti (MHNP: Jousseaume, eighteen); Aden (MHNP: Jousseaume, twelve; NM G2692: H. Burnup, one; AMS C34372: C. Hedley, one; BM(NH): A. J. Peile, two; BM(NH) 1902.10.10.26. H. C. Dinshaw, one; BM(NH) 1903.2.7.37–38: E. R. Shopland, two; BM(NH): Biggs, four); Slave Island, Aden (P. Cambridge colln., one); Bandar Sheikh, Little Aden (BM(NH): Biggs, one); 13°51′30″N, 47°49′12″E, 91 metres (BM(NH): John Murray Expedition, one); 12°12′30″N, 43°45′30″E, 16 fathoms (BM(NH): J. Murray Expedition, one worn); Berbera (RSM: Salisbury, one). GULF OF OMAN: 37 fathoms, 156 fathoms and 235 fathoms (BM(NH): F. W. Townsend, twenty, five and three respectively); 25°10′48″N, 56°47′30″E, to 25°09′48″N, 56°47′30″E, 210 metres (BM(NH): John Murray Exped., three); Masirah Island (Mrs K. Smythe colln., one); Muscat (NM

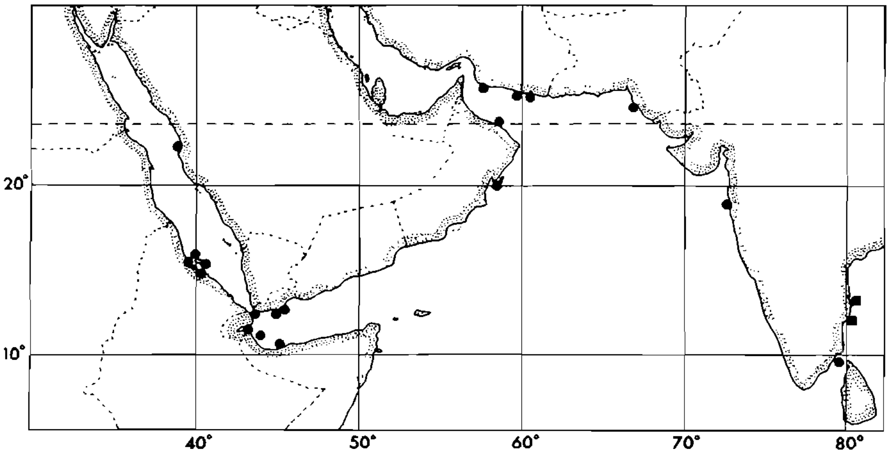

20°
10°
40°
50°
60°
70°
80°

Fig. 207. *Ancilla ovalis* (●) and *A. chrysoma* (■), distribution (excluding Persian Gulf).

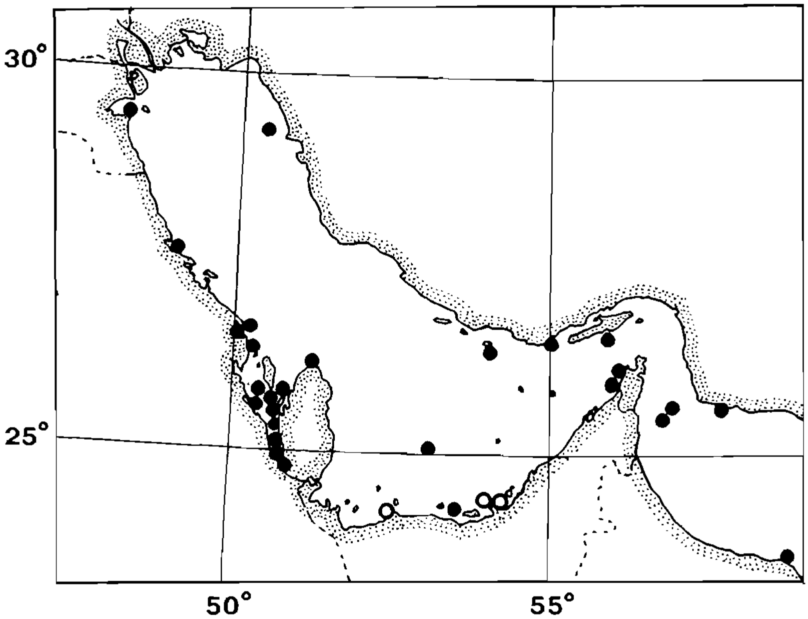


Fig. 208. *Ancilla ovalis*, distribution within Persian Gulf; circles represent literature records.

G5087: F. Luther, two; NM H9672: W. Falcon, two; BM(NH) 98.6.15.3: one; BM(NH) 1953.3.10.178–187, dredged Winckworth, ten; BM(NH) 1954.3.10.73–76: Winckworth, four littoral; NMW: Townsend, eleven). TRUCIAL STATES: Ash Sha'm (As Shaarm) (NM G2372: Mrs K. Smythe, two); Abu Hayl (NM G1685: Mrs K. Smythe, one); 25°46'00"N, 55°47'30"E, 9 metres (RNHL: A. J. Keij, 1966, two); 25°11'40"N, 53°12'30"E, 14 metres (RNHL: H. Clarke, 1965, two juveniles); Khor-al-Bazm (BM(NH): G. Kendall, twelve). QATAR: Qatar Peninsular (BM(NH): C. Williamson, two); Dohat-al-Hussein (Duwhat al Husayn) (BM(NH): McQueen, one). SAUDI ARABIA (Persian Gulf coast): Ra's at-Tannurah (Ras Tanura) (BM(NH): P. Webb, fourteen, and Grantier, seven); Al Oqair, 10 metres (NM G4018: Mrs L. Johansen, three); Dahran (NM G7935: Mrs Grantier, one); Manifa, sticky mud, 9,4 m., and near Qatif at L.T. (Mrs L. Johansen colln.); Dōhat as Salwa, as follows: 24°57'N, 50°46'E, 17 metres, four; 24°46'N, 50°42'E, 14 metres, one; 25°30'N, 50°39'E, 20 metres, three; 25°55'N, 50°22'E, 23 metres, two; 25°04'N, 50°42'E, 14 metres, one; 25°40'N, 50°42'E, 10 metres, three; 24°46'N, 50°47'E, 14 metres, one; 25°24'N, 50°43'E, 15 metres, one (all RNHL: A. J. Keij, 1966). KUWAIT: As Sálimíyah (Salamiah) (NM G2691: Mrs B. A. Glayzer, nine). IRAN: Pearl Banks, 2 mi. SSE of Qais Island (Jazireh Qais), 3–4 metres (ZMC: G. Thorson, one dead); off Kharg Island (Jazireh-ye-Khārk), 18 metres, sand and shells (ZMC G. Thorson, one); Chāh Bahār (Charbar), 40 fathoms (NMW: Townsend, juveniles); Jask (RSM: Townsend); off Lingah, 5 fathoms (NM H9669: W. Falcon, presumably ex Townsend, two); Jask and Henjam Island (Jazireh-ye-Hangām) (BM(NH): Townsend, numerous); Makran coast (BM(NH) 96.12.1.31–32: Townsend, two; USNM 150719: ex H. Fulton, two). PAKISTAN: Karachi (BM(NH): Townsend, three; NMW: Townsend, 1891, seven). INDIA: Bombay (BM(NH): Townsend, fourteen); 'dr P. B. Mannar' [= dredged Palk Bay, Manaar] (BM(NH) 1953.3.10.134: R. Winckworth, 1938).

Literature records: TRUCIAL STATES: N. coast Jazirat as Sa'diyat; Ash Shuwayhat (Shuweihat), W. coast of Jabalaz Zannah (Jebel Dhanna); E. of Halat al Bahrani; 1 mile N. of NE Halat al Bahrani (all Biggs, 1973, as *A. eburnea*).
Erroneous: Mauritius and St Anne, Seychelles (von Martens (1880), probably based on *A. sarda*).

Type material: The type material of *Ancillaria ovalis* is lost. In view of the confusion that has attended this species, a neotype, NM H9967/T2436, is here designated. This specimen (Fig. 198), which measures 10,4 × 5,5 mm, represents the typical ventricose white form. Type locality (unknown to Sowerby) Ash Sha'm (As Shaarm or Ras ash Sha'm), Trucial Oman, 26°02'N, 56°05'E.

Habitat: *A. ovalis* largely inhabits areas where mean water temperatures range between 16° and 34° C, and salinities between 35,5 and 44,5‰. It burrows in sand or mud, from low tide to depths of 430 metres or more. In the Persian Gulf it burrows about 1 cm below the surface of the sand, in association with *Umbonium vestiarum*, *Mitrella blanda* and *Cerithium* spp. (Mrs K. Smythe, pers. comm.).

Taxonomy: *Ancilla ovalis* is a polymorphic species, and while typical squat white specimens have sometimes been correctly identified, narrow white examples and banded ones have invariably been misidentified as *A. eburnea* (Deshayes, 1830) and *A. fasciata* (Reeve, 1864), respectively. White examples occur throughout the range of the species, although there is some indication that they may sometimes form separate colonies. Banded specimens (Figs 195–197, 199) appear to occur only in the Persian Gulf and Gulf of Arabia, while brown specimens (Fig. 200) are characteristic of the Gulf of Aden and Red Sea. The ancillid band in the latter material tends to be narrower than in the Persian Gulf/Oman form (mean ancillid band/fasciolar band ratio 0,54 as against 0,68, N = 29 and 39 respectively).

Museum material, mostly collected by W. F. Townsend, appears to demonstrate the occurrence of an interesting bathymorph (Figs 201, 202) in the Gulf of Oman and Strait of Hormuz. This form is dwarfed (total length 4,9–11,1 mm) and colourless, with a relatively heavy callus in the parietal region, a more or less subcylindrical form and frequently a rather cyrtoconic spire. Most specimens are slender (breadth/length ratio 0,42–0,48), but plump individuals (breadth/length up to 0,58) have been examined. Extreme examples are translucent and narrow with a labium that is distinctly patulous towards its base. Viewed in isolation, such specimens could be taken to represent a different species, but in fact prove to be the terminal point in a continuous, intergrading series. Bathymorphic variants have been examined from depths of 37, 45, 156 and 150–200 fathoms in the Gulf of Oman, and 45 fathoms off Kuh-i-Mubarak, plus a large series from unstated depths off Henjam Island. Unfortunately the presence of typical material, labelled as originating in 235 fathoms in the Gulf of Oman, throws some doubt on the absolute reliability of Townsend's documentation. This, together with the juvenile or eroded state of most of the other dredged material seen, renders a definitive statement on bathymetric parameters impossible.

In all its forms *A. ovalis* can be recognised by the small columella pillar and unusually prominent labral tooth.

Another puzzling specimen is the single shell seen from south-eastern India. This agrees well with *A. ovalis* in basic shape, strength of labral tooth, columella form and coloration, although its pattern of small white squares on an orange ground is certainly aberrant. The main difficulty, however, lies in the presence of a well-developed parietal 'scar', not seen previously in *A. ovalis*. Whether this specimen represents a distinct taxon or not remains to be shown.

Ancilla sticta sp. n.

Figs 1, 60, 176, 203–204

Diagnosis: Shell narrowly oblong-fusiform (breadth/length 0,40) with high, acute, orthoconic spire, angle 47°, aperture/total length 0,53; sutures thinly calloused; ancillid band flattened, almost flush, crossing paries near its posterior end, labral denticles weak; columella pillar small, with 4 lirae; paries uncalloused; brownish-orange with dense, regular white spots; length 12,7 mm.

Description:
Quantitative (N = 1):
Breadth/length: 0,40
Aperture/total length: 0,53
Spire angle: 47°
Dimensions: 12,7 × 5,1 mm

Shell narrowly oblong-fusiform, greatest width anterior to midline, body whorl with a slightly flattened periphery which forms a faint suggestion of a shoulder, base with evenly rounded sides; spire high, acutely orthoconic, whorls flattened, sutures masked by a thin callus deposit. Aperture with its widest point median, posterior end acutely pointed, anterior end slightly curved and narrowed; base moderately oblique, siphonal canal very shallowly notched. Surface smooth, microshagreen sculpture very fine, mainly visible between columella lirae and on siphonal border of fasciole, but faintly discernible on paries and behind lip. Ancillid groove shallow, forming a small blunt denticle on labrum, and crossing paries well posteriorly (ie. at about 0,95 of length of labium from base); ancillid band flattened and almost flush, fairly wide (0,66 width of fasciolar band); fasciolar band flattened, slightly declivous, anterior fasciolar groove deep. Columella pillar small, oblique, its lip gently convex, with a shallow basal notch; lirae four, becoming progressively weaker towards inner edge, outer lira demarcated by an interval that is deeper than the others. Paries gently convex, without callus, with a slight suggestion of a longitudinal ridge. Labrum incurved posteriorly, slightly convex and prosocline in side-view.

Teleoconch whorls three. Protoconch (Fig. 60) of 1,5 whorls, shape narrowly domed, with strongly-rounded initial whorl; maximum diameter 1,25 mm.

Ground colour moderate orange, darker at suture and with traces of darker transverse zones; covered with small, oval, somewhat diffuse, pale spots (average diameter on body whorl approximately 4 mm), arranged in a regular pattern; columella pillar white; aperture light orange with a white band at its base and a second median one; protoconch white.

Distribution: Gulf of Aden (off South Yemen).

Type material: Holotype BM(NH): John Murray Exped. Sta. 191, 13°36'30"N, 47°48'54"E, 274 metres.

Taxonomy: This species, unfortunately known from only a single dry specimen, is unique within the subfamily Ancillinae in its spotted colour pattern. In general form it rather resembles certain species of the genus *Olivella* Swainson, 1831, but the calloused sutures and well-defined columella pillar and ancillid groove show it to be an ancillid.

Ancilla (Sparella) ventricosa (Lamarck, 1811)

Diagnosis: Shell oblong-ovate to subcylindrical, breadth/length 0,45–0,59, spire acute to obtuse, angle 59°–108°, often cyrtoconic and mamilliform; aperture/total length 0,58–0,73; columella pillar short, strongly twisted, with 2–5 evenly spaced lirae; no ancillid groove or denticle; base oblique; microshagreen sculpture faint.

Colour cream to deep orange, sometimes with darker axial and spiral lines of flesh to orange-brown. Maximum length about 38 mm.

Distribution: Red Sea to southern Mozambique and east coast of India; absent from Persian Gulf.

Taxonomy: This characteristic Indian Ocean species is one of the most variable members of the genus. Nevertheless, the Red Sea population (*fulva* Swainson, 1825) is sufficiently distinctive and constant in its characters to warrant recognition at the subspecies level. Intermediates occur in the zone of contact with the nominate subspecies.

Although *A. ventricosa* lacks a definite ancillid groove, a vestigial furrow may on occasion be present.

Ancilla ventricosa ventricosa (Lamarck, 1811)

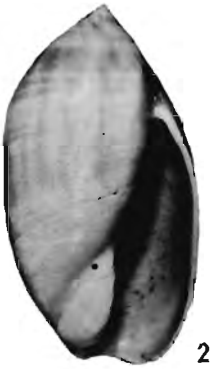
Figs 3, 62, 209–216, 221–223

Ancillaria ventricosa Lamarck, 1811: 304; *idem*, 1822: 413 (cites Martini, 1773, pl. 65, fig. 731); Sowerby, 1830: 6, figs 27–32 only; *idem*, 1859: 61, pl. 214, fig. 87 only; Chenu, 1859: fig. 890; Weinkauff, 1878: 6, pl. 2, figs 7, 8. Type locality unknown.
Ancillaria (Sparella) ventricosa; von Martens, 1903: 109.
Ancillaria variegata Swainson, 1825: 278; Sowerby, 1859: 61, pl. 214, figs 70, 71. Type locality: 'East Indies'.
Sparella variegata; Gray, 1865: 38.
Ancillaria fulva (*non* Swainson, 1825); Sowerby, 1859: 61, pl. 214, figs 72, 75; Reeve, 1864: pl. 6, fig. 18; Weinkauff, 1878: 9, pl. 3, figs 7, 8; von Martens, 1879: 729; Smith, 1891: 411; Shopland, 1902: 173.
Ancillaria castanea (*non* Sowerby, 1839); Kiener, 1844: 20, pl. 6, fig. 1.
Ancilla cinnamomea (*non* Lamarck, 1801); Abrard, 1942: 82, pl. 8, fig. 20; Spry, 1968: 23.
Non *Ancillaria ventricosa*; Swainson, 1825: 279, and Kiener, 1844: 18, pl. 6, fig. 3 [= *Ancilla castanea*]; Hanley in Wood, 1856: 94, pl. 18, fig. 43 [= *Anolacia tumida*]; Reeve, 1864: pl. 6, figs 15 a–c [= *A. v. fulva*].

Diagnosis: Shell ovate to ovate-cylindrical (mean breadth/length 0,52), spire generally low, mean apical angle 75° (maximum 102°), mean aperture/total length 0,65, base moderately oblique; labrum thickened in adult, sometimes preceded by a series of growth plicules. Flesh-colour to cream, usually with spiral and axial lines of brown. Maximum length about 38 mm.

Description:
Quantitative (N = 185):
Breadth/length: 0,45–0,59 (M = 0,52; SD = 0,05)
Aperture/total length: 0,58–0,73 (M = 0,65; SD = 0,04)
Spire angle: 60°–102° (M = 74,8°; SD = 8,1°)
Maximum dimensions: 37,5 × 20,1 mm
Minimum adult dimensions: 7,3 × 3,7 mm

Shell typically ovate with a convex-sided body whorl and obtuse, cyrtoconic spire, but generally ovate-cylindrical with a more acute spire, rarely coeloconic; apex papilliform, rarely mamilliform, spire whorls weakly to strongly convex; greatest width more or less median. Aperture acute posteriorly, widest medially, siphonal canal wide and shallowly notched, columella pillar foreshortened so that base is slightly oblique. Surface smooth, save for a series of strong, sometimes pliculate growth lines just behind labrum and weaker ones on the fasciole; microshagreen sculpture faint, with traces between the columella pleats and behind labral edge. No ancillid groove or labral denticle; fasciolar band convex.



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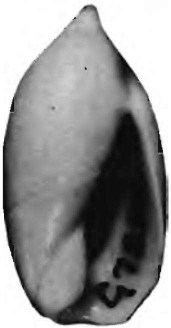

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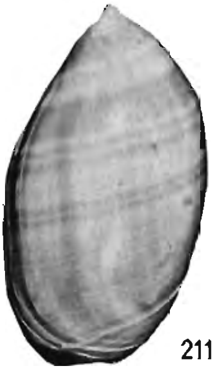

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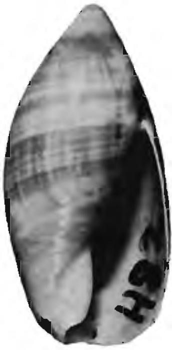

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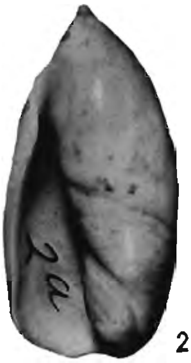

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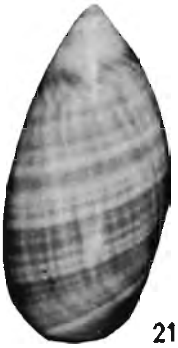

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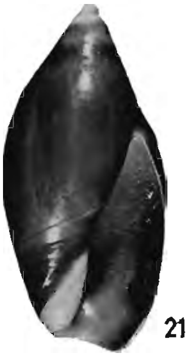

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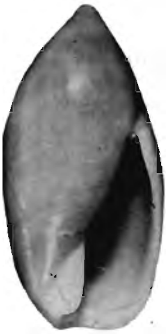

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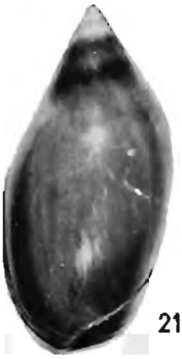


217

Figs 209–217. *Ancilla ventricosa* (Lamarck, 1811). 209–214, 216, *A. v. ventricosa:* 209, 211, Aden, NM G4509, 31,3 × 17,1 mm; 210, Madras, NM G7850, 19,6 × 10,0 mm; 212, 214, Conducia Bay, Mozambique, NM H82, 22,3 × 11,1 mm; 213, Sinistral, Zanzibar, RNHL colln., 27,8 × 4,3 mm; 216, Dwarf golden form, Port Amelia, NM G3166, 14,5 × 7,3 mm. 215, 217 *A. v. fulva* (Swainson, 1825), neotype, NM G1163, 30,7 × 15,0 mm.

slightly elevated. Columella pillar strongly twisted, 0,46–0,52 of total length of labium, its edge convex; lirae 2–7 (50% of sample with 3, 25% with 4) of which the outermost is the strongest; there is no subdividing furrow. Paries evenly and gently convex, calloused only at the labral-labial junction. Labrum slightly incurved, posteriorly usually thickened.

Teleoconch whorls about three in number. Protoconch (Fig. 62) narrowly domed, of about 1,5 whorls, maximum diameter 1,3–1,9 mm.

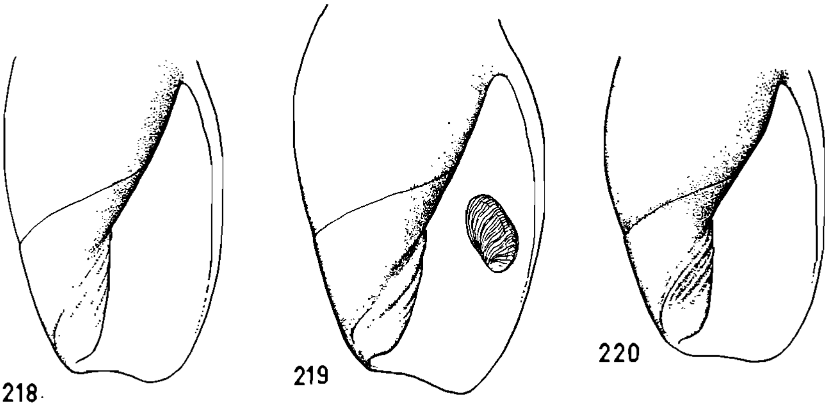
Ground colour pinkish-white to light brown or light greyish-brown, with or without spiral and axial lines of light brown or moderate reddish-brown, spiral element usually but not always dominant; rarely light orange-yellow; aperture moderate or greyish yellowish-pink; columella white, sometimes tinged with orange basally. Pure white examples occur.

Operculum transparent yellow, 0,17–0,21 length of aperture, oval.

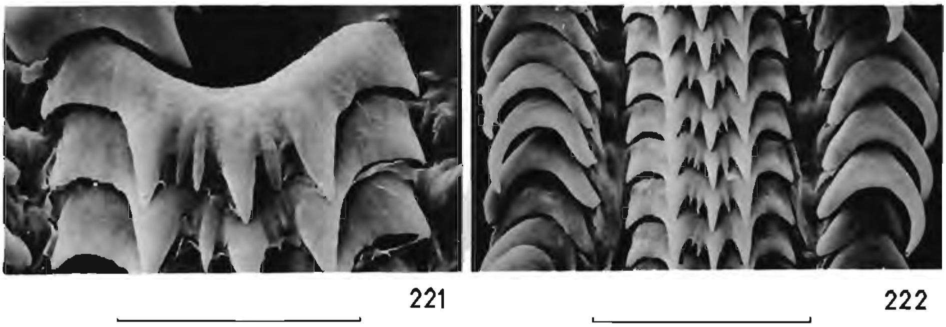
Radula (Figs 221–222, 231) with broad, tricuspidate rachidian, intervals with 1–2 strong denticles; laterals normal; about 73 rows.

Distribution (Fig. 223): Gulf of Aden to the east coast of India and south to Mozambique and Madagascar.

Material examined: GULF OF ADEN: Aden (USNM 306027: Bendall, two; MHNP: Jousseaume, 1921, six; MHNP: one juvenile; MHNP: S. de Morgan, 1922, three juveniles; MHNP: Denis, 1945; NM G4509: H. Burnup, two; RNHL: van Rees, one; BM(NH): H. Biggs, leg. Lander, two; BM(NH) 1902.10.10.43–45: H. C. Dinshaw, three; BM(NH) 85.8.0.78–80: A. W. Baynham, three; BM(NH) 1903.2.7.34 and 1902.2.12.11–17: E. R. Shopland, eight); Aden harbour (RNHL: H. Strengers & L. E. Nobel, ten; AMS C 40128: C. Hedley, two); Crater Beach, Aden (RNHL: Strengers & Nobel, 1930, four); 13°51'30"N, 47°49'12"E, 91 metres (BM(NH): John Murray Exped., Stn. 189, one broken); Djibouti (NM G7853: H. Falcon, one; MHNP: C. Gravier, 1904, four juveniles; IRSN: G. Moazzo, two; MHNP: Jousseaume, 1921, four; in A. Jenner colln., leg. J. Lavranos, 1972, one); Dorale, 10 mi. W. of Djibouti (A. Jenner colln., leg. J. Lavranos, 1971, one); Bosaso (NM G315: J. Lavranos, 1972, one,



Figs 218–220. *Ancilla* species, base of body whorl. 218, *A. adelphe* sp. n.; 219, *A. ventricosa fulva* (Swainson, 1825); 220, *A. sarda* (Reeve, 1864).



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222

Figs 221–222. *Ancilla ventricosa*. SEM photograph of air-dried radula. 221. Rachidian plates, scale line = 0,05 mm; 222. Transverse rows, line = 0,1 mm.

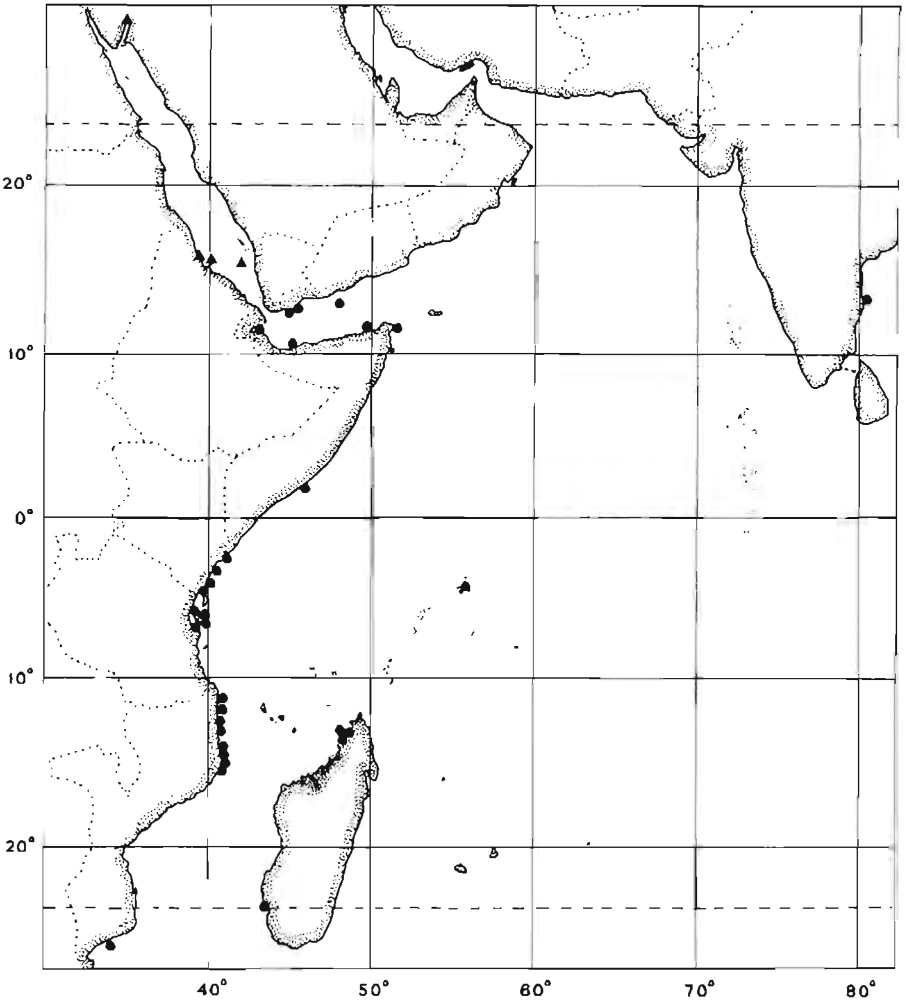


Fig. 223. *Ancilla ventricosa*, distribution. ● = *A. v. ventricosa*; ▲ = *A. v. fulva*.

and in Jenner colln., three); Berbera (RNHL: Mulder, one; RSM: Salisbury, forty; NM H9667: W. Falcon, six). EAST SOMALIA: Tohen, about 20 km S. of Cape Guardafui (A. Jenner colln., leg J. Lavranos, one); Mogadiscio (USNM G73858: D. Emrich). KENYA (A. Jenner colln., two): Lamu (NM F8210: Mrs B. Hooper, 1971, one; A. Jenner colln., leg. Mrs B. Hooper and Mrs Bentley-Buckle, 1975, three); Malindi, 3–5 metres, by dragnet (AMS C102284: E. Afr. Mar. Fish. Res. Org., one juv.); Mombasa (BM(NH): McKinnon-Wood); Nyali Beach, Mombasa, on 'turtle grass' and in 2 metres in lagoon (N. Bruce colln., three); Ras Iwetine, sand in lagoon, 1 metre (N. Bruce colln., one); Shimoni (A. Jenner colln., leg. Mrs Hooper, 1975, three) and Wasin Island (N. Bruce colln., one), Wasin Channel, 8 metres on coarse sand (BM(NH): J. D. Taylor, 1971, one) and Mwamba Channel, *Thalassia* beds (BM(NH): Taylor, 1971, one), all Shimoni; Funzi, sandbank (BM(NH): J. D. Taylor, 1971, one living). TANZANIA: Zanzibar (NM G1767, one; RNHL: Derx, five, one sinistral); Mnazi Mmoja, Zanzibar (USNM 604447: R. T. Abbott, 1965, three); Bweju, S.E. Zanzibar (USNM 604360: R. T. Abbott, 1950, one, white); N.W. coast of Zanzibar (BM(NH): Bangor-Watamu Exped., 1969, bottom dredge, one); Dar es Salaam (BM(NH) 1933.1.5.187–192: B.M. E. Afr. Exped., 1924, six). MOZAMBIQUE: Vamizi Island, in sand (in A. Jenner colln., leg. J. Polack and H. van Hoepen, 1973, 5); Pangane, dredged in 2–5 metres (NM: A. Jenner colln., five) and in ± 6 metres (in A. Jenner colln, leg. M. Lohr); Quirimba Island (NM G3167, one, and in A. Jenner colln., one, both leg. Mrs L. Gessner); Uimbe Beach, Port Amelia, (NM G2694: A. Jenner, three; NM G3166: A. Jenner, one, yellow form; in colln. A. Jenner, three, yellow form). Memba Bay, sandy area outside rocks, near *Thalassodendron*, 2 ft above L.S.T. (NM H101: K. Grosch); Nacala Bay (NM F5666, one, yellow form), fine sand near deep water, 0,9 m above L.S.T. (NM H105: K. Grosch, 1958) and on sandflat above *Thalassodendron* near rocks, 0,9 m above L.S.T. (NM H102: K. Grosch, 1956); Conducia Bay (NM H103: K. Grosch, 1974, five), on soft muddy sand above *Thalassodendron*, 0,6 m above L.S.T. (NM H110: K. Grosch, 1974), in soft sand near *Thalassodendron*, 0,3 m above L.S.T. (NM H109: K. Grosch, 1974) in fine sand near rocks and *Thalassodendron*, ± 1,2 m above L.S.T. (NM H107: K. Grosch, 1953), and same habitat, L.S.T. (NM H82: K. Grosch, 1966); Mozambique Bay, west of Sanculo, sand near *Thalassodendron* and rocks, ± 0,6 m above L.S.T. (NM H108: K. Grosch, 1961); Lunga Bay, fine sand near *Thalassodendron*, ± 0,6 m above L.S.T. (NM H106: K. Grosch, 1963), also on a slightly muddy sandflat, ± 0,6 m above L.S.T. (NM H104: K. Grosch, 1963); between Inhaca Island and Ponta Zavora, *ex pisce* (NM G2688: C. P. Fernandes, 1974). MALAGASY REPUBLIC (dwarf form): Baie d'Ambanoro, east of Hellville, dredged 20–24m (IRSN: G. Petit, 1920, one); Ampasipohe, S.W. of Nosy Bé, littoral (IRSN: G. Petit, 1921, two); Nosy Komba, village Andrikarikabi, 6 metres (IRSN: G. Petit, 1920, two); Tulear (B. Thomassin colln., one); Ampasindava Bay, Nosy Bé, (IRSN: Petit, one). SEYCHELLES: Praslin Island (NM H9946: R. C. Wood). INDIA: Madras, at low tide on sandy shore (NM G7850: A. R. Bhagat, four).

Doubtful record: INDIA: Bombay (BM(NH): H. Cuming, three).

Literature records: MOZAMBIQUE: Mozambique Island (von Martens, 1879). Unconfirmed or doubtful records: off Dar es Salaam, 404 metres, and Zanzibar Channel, 463 metres (von Martens (1903), queried by Thiele, 1925); Bengal, India (von Martens, 1903).

Erroneous records: Bandar Abbas, Iran (Melvill & Standen, 1901) and Karachi, Pakistan (Burch & Burch, 1958) [based on *A. castanea*]; 'East Indies' (Sowerby, 1830).

Fossil records: PLEISTOCENE: Djibouti Republic, north of Ras Bir, ± 40 metres, and between Hacoulta and Mount Assaguineita, 0,20 m (Abrard, 1942).

Type material: The holotype of *Ancillaria ventricosa* was figured neither by Lamarck nor any of the subsequent custodians of his collection, and his figure-reference actually portrays a juvenile *Cypraea*. Fortunately, a single specimen is still preserved in the Lamarck collection (MHNG 1354/51) and is here regarded as the holotype. It measures 22,1 × 12,4 mm, but is badly worn. A syntype of *Ancillaria variegata* is present in the Broderip collection, BM(NH) Reg. No. 197821; dimensions 27 × 15,7 mm. In its squat form, the type specimen of *A. ventricosa* (and also that of *A. variegata*) agrees well with examples from Aden, which is here designated as type locality.

Habitat: *A. v. ventricosa* burrows in fine to coarse sand, sometimes muddy or in beds of marine grasses, from low-tide banks to about 24 metres (with one record from 91 metres). It chiefly inhabits waters of normal salinity (35–36,5‰) and a mean annual temperature of about 25–29° C.

Taxonomy: *A. v. ventricosa* is one of the most variable members of the genus, and it is surprising that its synonymy is not a good deal longer! To some extent this variation is geographic, the result of the development of local morphs in various parts of its range. However, several variants may co-exist at the same locality; for example, in the Gulf of Aden, narrow, high-spired shells and obese, obtuse-spire ones are found together. In the Gulf of Tadjoura there appears to be some intergradation with the narrow Red Sea subspecies *fulva*. Within the Gulf of Aden population the breadth/length ratio varies from 0,45 to 0,59 with a CV of 5,56 (N = 111). In contrast, on the east coast of Africa the overall obesity range is similar (due to the occasional occurrence of ventricose individuals in Kenya), but the CV is 4 (N = 74). Tanzanian and Mozambique examples are invariably narrow and subcylindrical. The most difficult variant to resolve is a small (13,7–16 mm), orange-yellow form (Fig. 216) with a relatively high spire (angle 65°–75°), that occurs at Nacala and Port Amelia in northern Mozambique, apparently together with normal *ventricosa*. Dwarf examples of the same morph appear to represent the species in the Malagasy Republic, the five specimens so far examined from there ranging in length from only 7,3 to 10,3 mm. There is some possibility that this form may prove to be a valid species. Curiously, the only specimen seen from the Seychelles, while pink in colour, in form appears to represent normal *v. ventricosa* in miniature.

A juvenile *A. v. ventricosa* from Aden in the Deschamps collection (IRSN) is labelled '*Ancilla deschampi* Ancey', a manuscript name.

Ancilla ventricosa fulva (Swainson, 1825)

Figs 2, 215, 217, 219

Ancillaria fulva Swainson, 1825: 278. Type locality unknown.
Ancillaria ventricosa (partim); Sowerby, 1830: 6, figs 25, 26 only; *idem*, 1859: 61, pl. 214, figs 88, 89 only; Reeve, 1864: pl. 6, figs 15 a–c; Weinkauff, 1878: 6, pl. 2, figs 3, 4.

Diagnosis: Shell narrower and somewhat more biconical than *v. ventricosa* (mean breadth/length 0,49), with a higher, generally orthoconic spire (mean angle about 65°, maximum 75°, mean aperture/total length 0,64), and strongly oblique base; labrum thin in adult; colour uniformly deep to brownish orange; maximum length about 32 mm.

Description:

Quantitative (N = 41):

Breadth/length: 0,46–0,53 (M = 0,49; SD = 0,02).
Aperture/total length: 0,60–0,68 (M = 0,64; SD = 0,02)
Spire angle: 59°–75° (M = 64,6°; SD = 4,2°)
Maximum dimensions: 32 × 16 mm
Minimum adult dimensions: 21,4 × 10,3 mm

Shell oblong-biconical with a very obliquely truncate base, spire high, generally orthoconic; columella with 3–4 lirae; labrum thin, even in adults. Colour deep orange to brilliant orange-yellow or brownish-orange, uniform save for a slight darkening at sutures and back of lip, and a lightening towards the whitish apex; aperture moderate orange to light reddish brown; columella rarely with an orange basal tinge.

Protoconch, radula and operculum as in *A. v. ventricosa.*

Distribution: Red Sea, from Gulf of Aqaba to the Dahlak Archipelago; absent from Gulf of Suez.

Material examined: RED SEA (NM F496: M. Couturier, one; MHNP: Letellier, 1949, three; MHNP: le Comte de Paris, 1847; RNHL: J. Mulder, three, and Ruyssenaers, 1849, eight; HUJ: three). ISRAEL: Eilat, 20 metres (NM F9493: D Peled, 1972, one). EGYPT (NM H9678: H. Becker, one). ETHIOPIA: Massawa (NMV: Jickeli, one); Hatitou, 12–14 fathoms (TAU 19, ex IRSE, 1965, one); Dankalia, 4–10 metres (NM G1163: D. Peled, 1971: seven); Dahlak Island (NM G1163: D. Peled, 1971, one; NMV: Jickeli, three; A. Jenner colln., one); Taulud Island, 6 m (NM G2668: D. Peled, one); Dahlak Kebir Island (A. Jenner colln., one). ADEN REPUBLIC: Jabal at Tair (Jebel Teir Island), 33 fathoms (HUJ: Oren, one).

Erroneous records: 'Aden' (AMS C52375: G. Hedley, two). 'Inseln Karak' [= Khárk Island, Iran] (NMV: Kotschy, one).

Type material: The types of *Ancillaria fulva* were in Swainson's private collection which was supposedly sold to the Manchester Museum, but which was probably taken to New Zealand (McMillan, 1980) and is lost. NM G1163/T2435 from Dahlak Island, leg. D. Peled, October, 1971, dimensions 30,7 × 15 mm, is here designated as neotype (Figs 215, 217).

Habitat: Burrows in coral sand at depths of 4–60 metres, inhabiting waters with a

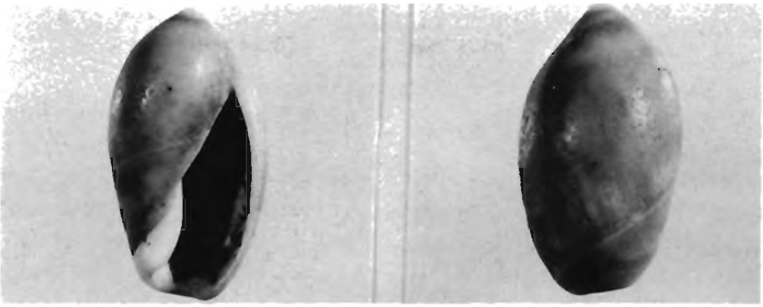


Fig. 224 a, b. Holotype of *Ancillaria ventricosa* Lamarck, 1881. Dimensions 22,1 × 12,4 mm. Photo courtesy of G. Dajoz, MNHG.

salinity range of about 36,5–41‰, and mean annual temperatures of 24–29° C.

Taxonomy: Previous authors have applied the name *fulva* to a colour form of *Ancilla ventricosa ventricosa*, often regarding the present taxon as the 'true' *ventricosa*. Swainson's description, however, is explicit. Comparing it with *Ancillaria variegata* [= *A. v. ventricosa*], he observed that *fulva* was 'much less ventricose and the base more oblique, . . . its spire also is more produced and pointed', and its colour was described as 'uniform orange-yellow or cinnamon colour'.

Intermediates between *A. v. ventricosa* and *A. v. fulva* occasionally occur in the western end of the Gulf of Aden and southern Red Sea. Such individuals generally possess a breadth/length ratio of 0,48–0,51 and a spire angle of 60°–65°. One example from Taulud Island in the Dahlak Archipelago is shaped like a typical *fulva* but has traces of the colour lines commonly seen in *v. ventricosa*. Such intergrades are rare.

Ancilla (Sparella) sarda (Reeve, 1864)

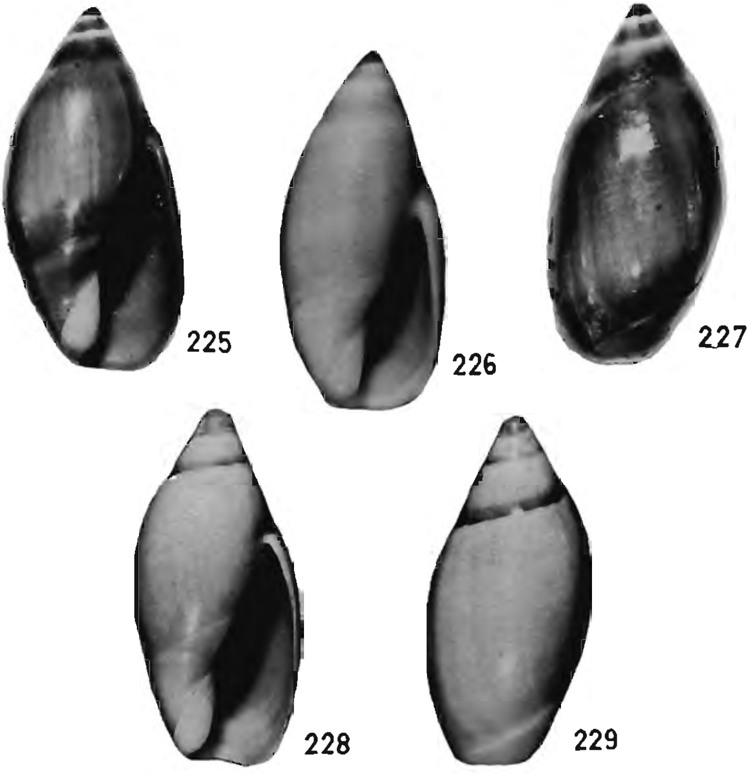
Figs 61, 221, 225–227, 230, 233–235

Ancillaria sarda Reeve, 1864: pl. 9, fig. 33; Weinkauff, 1878: 37, pl. 11, figs 8, 10 (after Reeve); von Martens, 1879: 729.
Ancilla sarda; E. A. Smith, 1906: 28.
Ancilla ampla (*non* Gmelin, 1791); Taylor, 1968: 202.

Diagnosis: Shell fairly small (maximum length 19 mm), oblong-ovate with high spire, angle 41°–73°, breadth/length 0,40–0,55, aperture 0,51–0,66 of total length, left side of body whorl usually more convex than right; no ancillid groove or denticle; columella pillar very short, with 1–5 low, broad lirae; fasciolar band narrow, slightly declivous. Colour yellowish-white to deep orange, with or without pale axial hair-lines; protoconch brownish-orange to white.

Description:
  Quantitative (N = 99):
    Breadth/length: 0,40–0,55 (M = 0,49; SD = 0,02)
    Aperture/total length: 0,51–0,66 (M = 0,58; SD = 0,04)
    Spire angle: 41°–73° (M = 59,8°; SD = 5,9°)
    Maximum dimensions: 19 × 9,5 mm
    Minimum adult dimensions: 8,9 × 4,2 mm

Shell fusiformly oblong-ovate, left side of body whorl typically more strongly convex than right, periphery at or just below middle. Spire high, cyrto- to orthoconic, apex only slightly papilliform, sutures masked by callus, spire whorls barely convex; aperture with its greatest width just anterior to midline, posteriorly acutely narrowed, anteriorly generally tapering slightly; base straight or slightly oblique; siphonal notch barely indented; labrum thickened, incurved and somewhat straight posteriorly, much less so anteriorly. Columella pillar short (0,39–0,46 of total length of labium), moderately twisted, lip straight or gently convex, basal sinus and bordering groove fairly shallow; lirae strong, usually subequal, 2–5 in number (over 70% of sample studied with 3,21% with 2), groove separating outermost two lirae sometimes slightly deeper than the others. Paries gently convex, without a parietal ridge or distinct callus deposit. No ancillid groove, denticle or band, although the occasional presence of a faint line may indicate the vestiges of the former; fasciolar band narrow, more or less declivous and evenly convex, its posterior border crossing the paries at a point about 0,52–0,65 from its posterior end. Very fine microshagreen sculpture on columella, anterior fasciolar groove, back of labrum and basal rim of fasciolar band, with traces on the paries.



Figs 225–229. *Ancilla sarda* (Reeve, 1864) and *A. adelphe* sp. n. 225–227, *A. sarda*: 225, 227, South of Mombasa, NM G8764, 18,1 × 8,3 mm; 226, Cerf Island, NM H9945, 16,2 × 7,5 mm. 228, 229, *A. adelphe*, holotype, 14,4 × 6,9 mm.

Teleoconch whorls about 3, protoconch (Fig. 61) of about 1,5 whorls, conical or narrowly domed, basal diameter 1,0–1,3 mm; limits sharply defined.

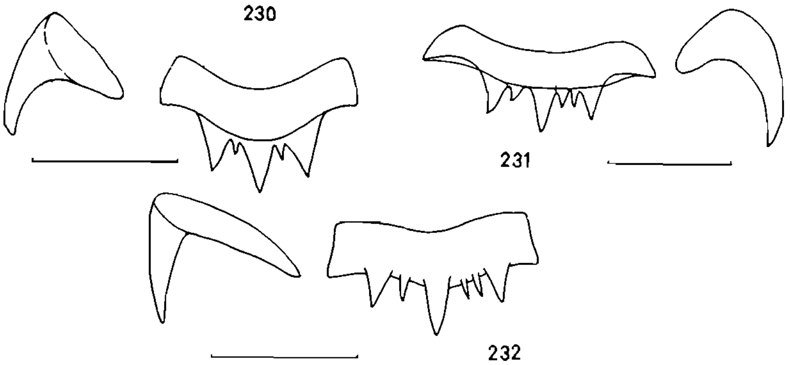
Ground colour light orange-yellow to deep or brownish-orange, or yellowish-white; a pale band is present below the suture, initiated at the commencement of the first teleoconch whorl by a series of dense axial white streaks, which become progressively more obfuscated with growth; sutural callus usually slightly darker than ground colour; in dark shells whole surface patterned by lighter and darker axial hair-lines; aperture paler than exterior, columella pillar white; protoconch uniform brownish-orange or orange-yellow.

Operculum unknown.

Radula (Fig. 230) with tricuspidate rachidian plate, median cusp longer than side cusps, with 1–2 weak intermediary denticles on each side; lateral tooth with uncinus equal to base in length. Number of rows about 60.

Distribution (Fig. 235): East Africa, from Somalia to southern Mozambique and Madagascar, and the islands of the Comores and Seychelles.

Material examined: SOMALIA: Sar Uanle, ± 20 km S. of Chisimaio (Instituto di Zoologia dell. Universita di Firenze, two); KENYA: Kikambala, 15 miles N. of Mombasa (NM F8041: A. Jenner, two); Mombasa (F. Luther colln., two; NM H9944: R. C. Wood, 1958, two); south of Mombasa, fringing reef at L.T. (NM G8764: M. Blöcher, 1971, ten); Malindi (USNM 595095: R. Teague, four); Shimoni (NM G7852: Mrs B. Hooper; A. Jenner colln., seven). TANZANIA: Zanzibar (BM(NH) 1904.10.20.218–223: J. Last, six); east coast of Zanzibar (USNM 598454: J. D. Robertson, 1950, three); Mnazi Moza, Zanzibar, 0–7 ft, rock, sand (BM(NH) 1962398: Nat. Sci. Found., 1957, one juvenile); Dar es Salaam (NM F8559: Mrs I. Lambert, two). MOZAMBIQUE: Port Amelia (NM F6618: A. Jenner, two); Conducia Bay (NM H85, G263: K. Grosch, twenty-six); Bazaruto Island (NM G4677: Mrs N. Cumming, 1975, two; NM G4093, NM G2023: Mrs E. Roscoe, 1973, two); Benguera Island (NM G2044: Mrs E. Roscoe, one); between Zavora and Inhaca Island, *ex pisce* (NM G2699: C. Fernandes, one). MALAGASY REPUBLIC: Tulear (B. Thomassin colln., six). COMORO ISLANDS: Sandy Island, Mayotte (NM G2669: Mrs E. Roscoe, one); Mayotte Island (AMS C40130 (*partim*): C. Hedley, one; IRSN: two). SEY-



Figs 230–232. *Ancilla* species, camera lucida drawings of radula; scale = 0,5 mm. 230, *A. sarda*; 231, *A. ventricosa*; 232, *A. thomassini*.

CHELLES (ANSP: 266201: Univ. of Miami, two; NM H9943: R. C. Wood, one; IRSN: R. Chérubin, numerous, juvenile); Mahé (BM(NH) 14.10.12.64: two); Victoria, Mahé, dredged, and in sponge-*Uca-Gafrarium tumidum* community (BM(NH): J. D. Taylor, seven; also ANSP 262824: Norbert, seven); Anse Boileau, Mahé (BM(NH) 1953.3.9.543, 525–531, 544–547, 5–32, 1953.3.10.38 –51, 103: R. Winckworth, twenty-eight); Anse Poule Bleu, Mahé (BM(NH): H. Dale, two); Anse Parnel, Mahé (BM(NH) 1953.3.10.100–102: R. Winckworth, three); La Digue (BM(NH) 1953.3.10.85: Winckworth, one); Frigate Island (BM(NH) 1953.3.10.88: Winckworth, one); Praslin Island (BM(NH) 1953.3.10.190–192: Winckworth, three); Cerf Island, in sand in lagoon (NM H9945: R. C. Wood, twenty-one).

Type material: BM(NH) 197214 contains two syntypes, without locality, from the H. Cuming collection; the larger, measuring 17,2 × 9,2 mm, is designated as lectotype (Fig. 233). The type locality is here designated as Zanzibar.

Habitat: *A. sarda* inhabits soft sand under and among rubble, often inside fringe reefs, from about a metre above low spring tide to a few metres below.

Taxonomy: Although there are no published synonyms, *Ancilla sarda* displays a remarkable degree of geographic variation, and is found in collections under a variety of names. The typical form (Figs 225, 227, 233) from Kenya and Tanzania is very distinctive on account of its bilaterally asymmetrical shape, dark orange colour and brownish-orange protoconch. However, on the islands of the Seychelles and Comores, occurs a population in which the shell is pale (light yellow to cream), the protoconch is usually white or flesh-coloured and the left side of the body whorl is scarcely more convex than the right. In form these are generally narrower and higher-spired than East African examples (Fig. 226). Although it may eventually prove feasible to recognise an insular subspecies, the *sarda* populations of Mozambique and Madagascar appear to be intermediate in characters, and a sharp dividing line between the two extremes cannot be drawn at this

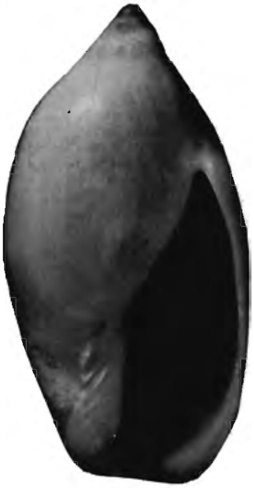


Fig. 233, *Ancilla sarda*, lectotype, BM(NH) 197214, 17,2 × 9,2 mm. Photograph courtesy BM(NH).

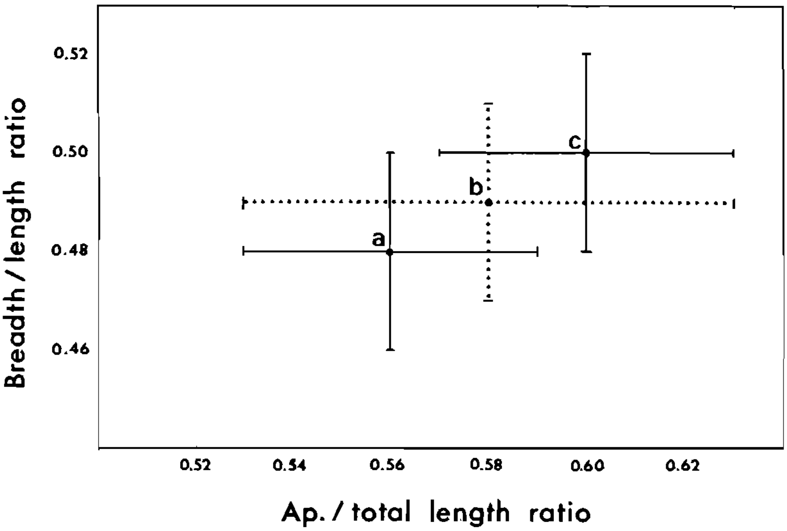


Fig. 234. *Ancilla sarda*, clinal variation across range; means and standard deviations of breadth/length and aperture/total length ratios. a, Seychelles and Comores (N = 52); b, Mozambique and Madagascar (N = 22); c, Kenya and Tanzania (N = 30).

stage. Indeed, the observed variation in *A. sarda* takes the form of an incomplete ring-cline, interrupted by the southern arm of the Somali Basin. One aspect of this variation, namely the clinal gradient in shell proportions between the East African and Seychelles populations, is illustrated graphically in Fig. 234.

An interesting feature of the phenotypic variation found in *sarda*, is the extent to which individuals from the insular tail-end of the cline resemble the allied or sister species, *Ancilla ventricosa* (Lamarck, 1811). Indeed, were it not for the intermediate populations linking the Seychelles–Comoro one to the typical form, and the occasional presence of an orange protoconch and *sarda*-like juveniles, one could equally well ally this material to *ventricosa*, which is rare in Madagascar/Seychelles and is represented there by a dwarf morph. On the other hand where *sarda* and *ventricosa* occur together in East Africa, there is no possibility of confusing the two. This may perhaps be ascribed to the character-displacement occasionally found where the ranges of sister-species partly overlap; here, to quote Brown & Wilson (1956), 'the differences between them are accentuated in the zone of sympatry, and weakened or lost entirely in the parts of their ranges outside this zone'. A possible explanation of the phenomenon, in this case, may lie in the potential function of shell morphology as part of the specific mate-recognition systems of the two species concerned. This would need to be reinforced only within the region of marked sympatry (ie. East Africa).

A single specimen of the pale insular form (AMS 102286: U. Brenneiser) labelled 'Kilifi, ca 55 mi N of Mombasa, Kenya', is presumably wrongly localised.

Ancilla (Sparella) adelphe sp. n.

Figs 66, 228–229, 235

Ancilla lineolata (*non* A. Adams, *partim*); Dautzenberg, 1932: 36.

Diagnosis: Shell oblong-ovate, width 0,48–0,50 of length, spire orthoconic, blunt, angle 55°–60°, elevated, aperture/total length 0,65–0,69; ancillid groove and band absent, fasciolar band slightly convex and raised; columella pillar fairly narrow, not strongly twisted, lirae four, paries gently convex, parietal ridge obscure, without callus, base of fasciole and columella pillar feebly and minutely microshagreened; colour more or less yellowish-white with a brownish-orange sutural line, fasciole and columella white, aperture light orange-yellow; maximum length 14,4 mm.

Description:

Quantitative (N = 2):

Breadth/length: 0,48–0,50
Aperture/total length: 0,65–0,69
Spire angle: 55°–60°
Maximum dimensions: 14,4 × 6,9 mm
Minimum dimensions: 13,0 × 6,5 mm

Shell oblong-ovate, with evenly convex sides, maximum width median; spire relatively high, rather blunt, orthoconic with almost flat whorls, sutural callus narrow. Aperture with its greatest width just anterior to median, tapering slightly anteriorly; base slightly oblique, siphonal canal wide, shallowly notched. Surface smooth, save for very fine to feeble microshagreen sculpture on fasciole and columella pillar. Ancillid groove, band and denticle absent; fasciolar band slightly declivous and a little convex, anterior fasciolar groove moderately deep. Columella pillar fairly narrow, not strongly twisted; lirae 4, strongest externally, becoming weaker towards lip, outer one sometimes weakly bifid; columella lip gently convex, 0,46–0,47 of total length of labrum; basal sinus shallow and rather wide. Paries gently convex, with feeble indications of a parietal ridge, and no trace of callus deposit. Labrum rather thin, prosocline and slightly sinuous in side view.

Teleoconch whorls about 3. Protoconch sharply delimited, of about 1,5 whorls, narrowly domed, apex well rounded, translucent white; maximum diameter about 1,5 mm.

Ground colour between yellowish-white and pale orange-yellow, becoming progressively fainter towards the apex; fasciolar band and columella pillar white; aperture light orange-yellow.

Distribution: Known only from southern Madagascar (Fig. 235).

Type material: Holotype and two adult paratypes (one with broken spire), plus two juveniles, all IRSN, leg. Decary; type locality Cap St Marie.

Taxonomy: Although recorded by Dautzenberg as *Ancilla lineolata*, this species differs widely in shape and coloration and in the absence of an ancillid band and groove. The same sample also contains a number of worn or juvenile *Ancilla* specimens, most presumably *A. sarda*.

A. adelphe superficially resembles the South African *A. fasciata* in form and colour, but differs in lacking an ancillid groove and brown ancillid band, and in its white columella pillar. Colour pattern separates it from *A. sarda* and *A. ventricosa*; the protoconch is larger than in *sarda*.

The range of *A. adelphe* is unknown, but it may prove to be endemic to the south of Madagascar, where temperatures are lower (mean surface-temperature in August 22° C, as against 24° C in the north), and coral reefs and mangrove swamps are replaced by dune sandstone and sandy beaches.

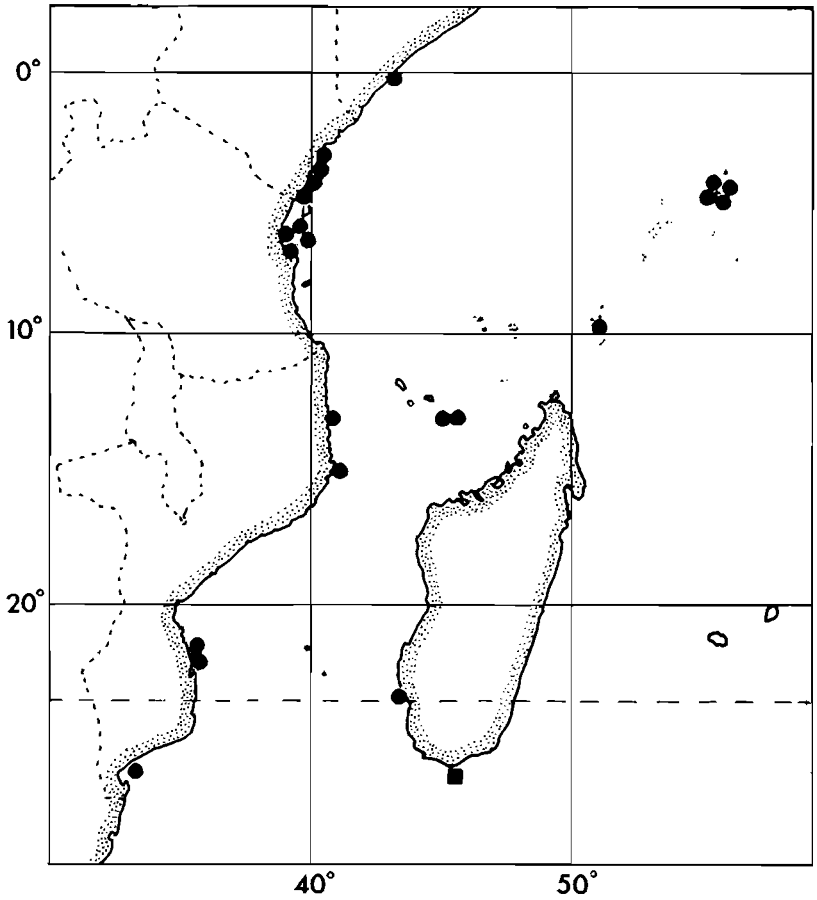


Fig. 235. *Ancilla sarda* (●) and *A. adelphe* (■), distribution.

Ancilla (Hesperancilla) matthewsi Burch & Burch, 1967

Figs 64, 236–240

Ancilla matthewsi Burch & Burch, 1967: 8, text fig. 1; Rios, 1970: 103, pl. 32. Type locality: off Fortaleza, Ceará, Brazil, *ex pisce*.

Diagnosis: Shell cylindric-fusiform, breadth/length 0,46–0,49, spire orthoconic, angle 52°–71°, aperture/total length 0,54–0,67; siphonal notch fairly deep; ancillid groove conspicuously crenulate, each crenule sometimes forming a short pleat, ancillid band declivous; labral denticle not at level of ancillid groove; columella pillar with 4–6 lirae; paries with a heavy callus, forming a longitudinal ridge-like thickening next to insertion of lip, fasciolar band usually forming a transverse ridge across labium; white to orange in coloration. Maximum length about 20 mm.

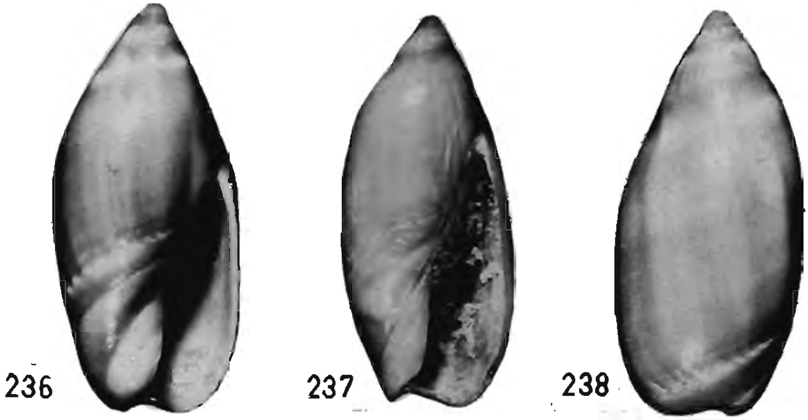
Description:
Quantitative (N = 5):
Breadth/length: 0,46–0,49 (M = 0,47; SD = 0,01)
Aperture/total length: 0,54–0,67 (M = 0,62; SD = 0,06)
Spire angle: 52°–71° (M = 59,8°; SD = 7,3°)
Maximum length (*fide* Burch & Burch, 1967): 20,1 × 5,0 mm
Minimum adult length: 11,5 × 5,6 mm

Shell cylindrical-fusiform, greatest width more or less median, body whorl gently convex, with at most a slight indication of a shoulder, labrum slightly flattened; spire high, orthoconic, sometimes with convex whorls, but usually with sutures completely filled with callus. Aperture somewhat lanceolate, acuminate behind, greatest width median, anteriorly curved and more or less parallel-sided; base usually slightly oblique; siphonal notch relatively deep. Surface usually smooth, sometimes with fine, ridge-like growth lines and very fine microshagreen sculpture on the columella pillar and anterior margin of the fasciole. Ancillid groove conspicuously crenulate, forming a series of 20–24 shallow pits, sometimes separated by short plicules along its boundary with the median zone; groove not reaching labral edge, denticle situated slightly posterior to the level of its termination; ancillid band declivous, flattened, fasciolar band similar but slightly convex. Columella pillar oblique, 0,48–0,52 of labium, its lip almost straight, basal notch wide and fairly deep; lirae 4–6, outermost one strong and separated from rest by a relatively wide gap. Paries heavily calloused, forming a ridge next to angle of aperture, fasciolar band usually projecting slightly at labium. Labrum thickened, shallowly concave and prosocline in side view.

Teleoconch whorls 3. Protoconch (Fig. 64) narrowly domed, of about 1,5 whorls (but limit ill-defined) and diameter 1,0–1,3 mm.

Colour medium to strong orange fasciole, protoconch, a line below suture and one on posterior border of ancillid band paler; aperture light orange, columella pillar white. Sometimes uniform white overall.

Operculum unknown.



Figs 236–238. *Ancilla matthewsi* Burch & Burch, 1967. 236, 238, off Fortaleza, Ceara, Brazil, NM G7798, 15,5 × 7,3 mm; 237, same data, 14,0 × 9,0 mm.

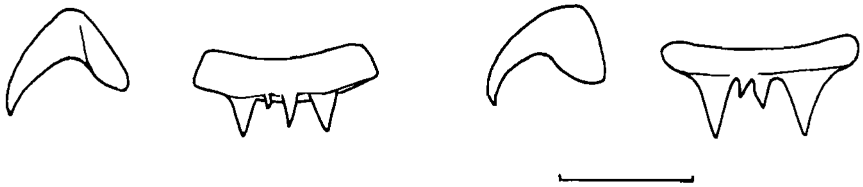


Fig. 239. *Ancilla matthewsi*, camera lucida drawings of two views of radula plates; off Fortaleza, Brazil; scale line 0,05 mm.

Radula (Fig. 239): rachidian plate tricuspidate, with median cusp weaker than side ones; a small intermediary denticle may be present, lateral plate with uncinus longer than base.

Distribution: Northern and north-eastern Brazil, from off the Pará River to off Fernando de Noronha Island (Rios, 1970).

Material examined: off Fortaleza, Ceará (NM G7798: B. Lafferty, one, trawled; NM G7978: T. Yocius, one, *ex pisce*; NM G7846: E. Rios, calcareous algae bottom, 27 metres, two; paratype BM(NH) 196743: one).

Type material: Holotype ANSP 308959, two paratypes ANSP 308960, other paratypes in private collections (Burch & Burch, 1967), and one in BM(NH), No. 196743.

Habitat: on a calcareous algae bottom in 22–86 metres (Rios, 1970).

Notes: Most known specimens appear to have been taken from the gut of the toadfish *Amphichthys cryptocentrus* (Valenciennes, 1837). One of the NM specimens retained a portion of the soft parts in highly-decomposed state, which yielded the radula but no operculum.

The original description and figures convey the erroneous impression that the sutures are clear of callus. The measurements given by Burch & Burch for their largest specimen (20,1 × 8,7 mm) imply unusually narrow proportions (breadth/length 0,43).

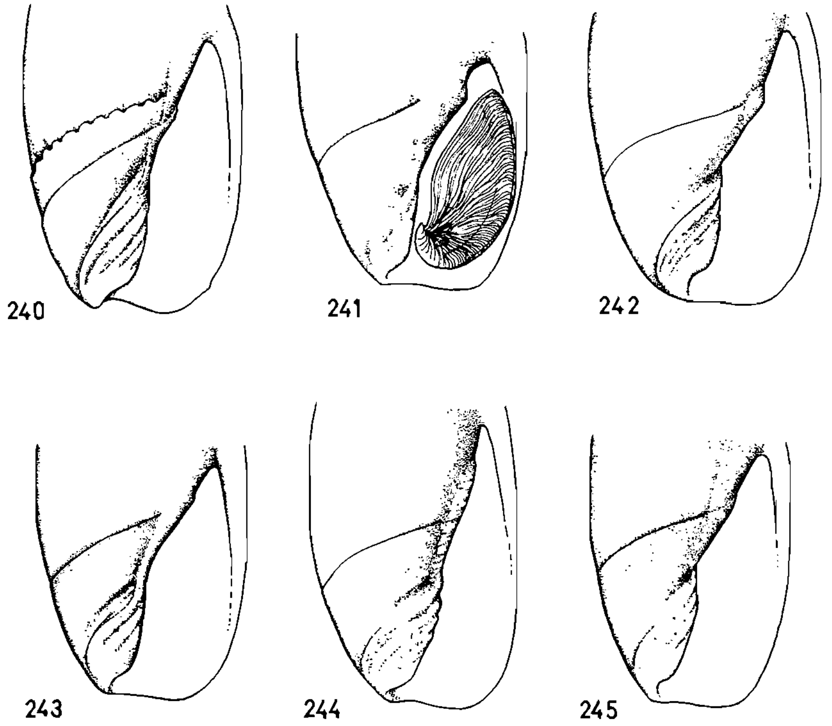
One of the NM shells (G7846) displays aberrant characters (Fig. 237), having convex spire whorls, distinct microshagreen sculpture (normally obscure) and pliculate growth-lines conspicuous on the spire. The significance, if any, of these variations from the norm cannot as yet be interpreted.

Ancilla (Chilotygma) exigua (Sowerby, 1830)

Diagnosis: Shell oblong-ovate, breadth/length 0,47–0,59, thick-walled, spire cyrtoconic with a thick callus, angle 52°–82°, aperture/total length 0,43–0,58; aperture strongly constricted behind; no ancillid groove or lip denticle; columella pillar small, with 2–3 thick lirae; paries thickly calloused, with a conspicuously projecting denticle; fasciolar band flush or slightly declivous, no ancillid band; sometimes sculptured by axial riblets; uniform white to light brown with white zones. Maximum length about 11 mm.

Distribution: Southern Red Sea to northern Mozambique.

Taxonomy: This distinctive little species appears to have two subspecies, the nominate one occurring from the Gulf of Aden northwards, while subspecies *sulcata* Thiele, 1925, replaces it in East Africa. However, although typical specimens are very distinctive, variation within *sulcata* sometimes blurs the dividing lines, and differences may even prove to be clinal.



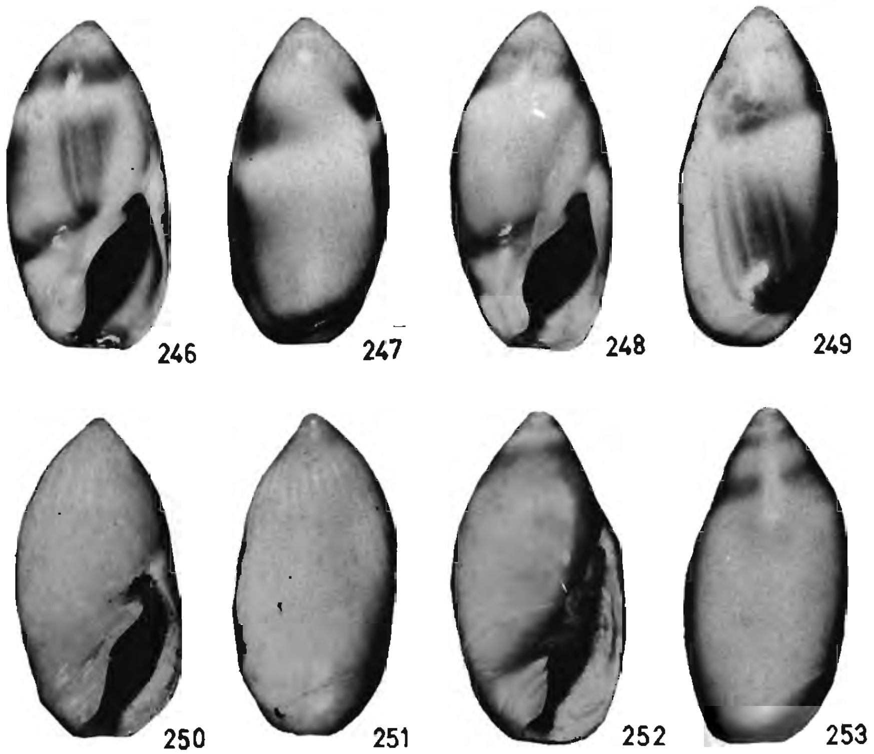
Figs 240–245. *Ancilla (Hesperancilla* and *Chilotygma*) species, base of body whorl. 240, *A. matthewsi* Burch & Burch, 1967; 241, *A. exigua exigua* (Sowerby, 1830); 242, *A. murrayi* sp. n.; 243, *A. minima* Thiele, 1925; 244, *A. testudae* (Kilburn, 1977); 245, *A. iota* sp. n.

Ancilla exigua exigua (Sowerby, 1830)

Figs 70, 241, 246–249, 259, 261

Ancillaria exigua Sowerby, 1830: 6, figs 33, 35; *idem*, 1859: 61, pl. 214, figs 80, 81; Reeve, 1864: pl. 11, fig. 47; Chenu, 1859: fig. 178; Weinkauff, 1878: 40, pl. 12, fig. 10. (after Reeve); Shopland, 1902: 173. Type locality unknown.
Ancillaria (Monoptygma) exigua; Sturany, 1905: 142.
Ancilla exigua; Biggs, 1972: 501.
Ancilla (Monoptygma) unidentata Sowerby, 1894: 160, pl. 12, fig. 20. Type locality: Bay of Zaila.
Ancilla (Chiloptygma) unidentata; Thiele, 1925: 155 (189), pl. 21 (33), fig. 13.

Diagnosis: Shell without axial pleats; parietal tooth only moderately strong, not bifid.



Figs 246–253. *Ancilla exigua* (Sowerby, 1830) and *A. murrayi* sp. n. 246–249, *A. e. exigua*, Aden, NM G2678; 246–247, 6,8 × 3,7 mm; 248–249, 8,6 × 4,2 mm. 250–251, *A. e. sulcata* (Thiele, 1925), Zanzibar, NM H5867, 6,8 × 3,7 mm. 252, 253, *A. murrayi*, holotype, 14,8 × 8,7 mm.

Description:

Quantitative (N = 26):

Breadth/length: 0,48–0,53 (M = 0,50; SD = 0,02)
Aperture/total length: 0,44–0,58 (M = 0,50; SD = 0,04)
Spire angle: 53°–80° (M = 64,1°; SD = 7,6°)
Maximum dimensions: 11,1 × 5,7 mm
Minimum adult dimensions: 5,4 × 2,6 mm

Shell generally thick-walled, oblong-ovate, spire slightly to strongly cyrtoconic; greatest width more or less median, sides of body whorl evenly convex; spire whorls heavily calloused, without indented sutures. Aperture small, obovate, greatest width anterior to middle, constricted behind, tapering slightly anteriorly; base slightly oblique, siphonal notch barely indented. Surface smooth, with fine microshagreen sculpture on columella pillar and anterior margin of fasciole. Fasciolar band usually flush with median zone, sometimes slightly declivous. Columella pillar short (0,41–0,54 of labium) and triangular, often bent to the right, its lip straight or slightly convex; lirae 2–3, strong, outermost one the best-developed. Paries with a thick, well-defined callus deposit extending past anal end of aperture as a pad, posterior end of labium with an angular projection at level of termination of posterior fasciolar groove. Labrum thick, particularly posteriorly, straight and slightly prosocline in side view.

Teleoconch whorls about 3. Protoconch (Fig. 70) narrowly domed, of about 1,5 whorls, maximum diameter about 1,0–1,2 mm, limits indistinct.

Colour usually light brown to moderate orange, darker at suture, with a pale to white subsutural zone, fasciolar band and apex; columella pillar and parietal callus also white. Sometimes uniform white overall.

Operculum lanceolate, transparent yellow, with fine growth lines and radial striae, 0,85–0,97 length of aperture.

Radula (Fig. 259) with narrow tricuspidate rachidians, the median cusp much longer than the side cusps, intermediary cusps 1–3, strong; lateral plates slender. Number of rows 76–78.

Distribution (Fig. 261): Southern Red Sea and Gulf of Aden.

Material examined: SOUTH YEMEN: Conquest Bay and Khormaksar Beach, Aden (BM(NH): H. E. J. Biggs, two); Aden (BM(NH) 96.5.6.109–120: Yerbury, twelve; BM(NH) 1902.10.10.29, 32–36: H. C. Dinshaw, six; BM(NH) 1953.3.10.149–150: Winckworth, two; NMW: Melvill-Tomlin, ten; USNM 130541: Chamberlain, three; NM G2678: H. Burnup, numerous, mainly immature). ETHIOPIA: Dahlak Is., 2 metres (NM G2675: D. Peled, one); Madot Is., 4 metres (D. Peled colln., one). SOMALIA: Zeila (Zaila) (syntypes of *A. unidentata*); Berbera (NMV 39905: Levander, 1895, two).

Erroneous record: 'Philippines' (BM(NH) 197869–71: H. Cuming, two, plus two *sulcata*).

Fossil records: QUATERNARY: Khormaksar sands, Aden, (P. Cambridge colln.)

Type material: Types of *Ancillaria exigua* evidently lost. Two syntypes of *A. unidentata* in BM(NH) as 1895.4.29.171–2. Type locality for *A. exigua* here designated as Aden.

Habitat: *A. e. exigua* appears to burrow just below the surface of fine sand, from low spring tide to about 100 metres. Mean temperature range within its distribution 23–33°C, salinity range about 35,5–39‰.

Ancilla exigua sulcata (Thiele, 1925)

Figs 250, 261

Ancilla (Chiloptygma) sulcata Thiele, 1925: 158 (189), pl. 21 (33), fig. 12. Type locality: off Dar es Salaam (5°55'S, 39°1'E), 50 m.

Diagnosis: Resembling *A. e. exigua*, but usually sculptured by a series of closely-situated, round-topped axial riblets, with sharply incised intervals; parietal denticle more conspicuous and usually bifid apically.

Description:

Quantitative (N = 14):

Breadth/length: 0,47–0,59 (M = 0,53; SD = 0,03)
Aperture/total length: 0,43–0,55 (M = 0,51; SD = 0,03)
Spire angle: 52°–82° (M = 64,5°; SD = 11,1°)
Maximum dimensions: 10,3 × 5,4 mm
Minimum adult dimensions: 6,4 × 3,3 mm

Axial riblets 24–34 in number when fully developed, becoming obsolete towards apex and on basal part of body whorl; sometimes restricted to periphery or developing only behind back of labrum, sometimes totally absent.

Distribution (Fig. 261): Kenya to northern Mozambique.

Material examined: Kenya: MOMBASA (NMW: Melvill-Tomlin, two; BM(NH): McKinnon Wood, one); Jadini, Diani Beach, in sand in lagoon (N. Bruce colln., two). TANZANIA: Dar es Salaam (syntypes) (NM G1682: W. Falcon, one); Zanzibar (BM 1904.10.20.2–6: J. T. Last, six; NM H5867: Falcon, one); Zanzibar Canal, 5°39′30″N, 39°11′30″E, 101 metres, coarse sand and shells (BM(NH) John Murray Exped., nine dead). MOZAMBIQUE: Port Amelia (A. Jenner colln.).

Fossil records: PLEISTOCENE: Ras Tshokir, Tanzania (Thiele, 1925).

Type material: Syntypes in BM(NH) 1948.12.10.14–15, in NMW and RSM (two each), and presumably in ZMB.

Habitat: borrowing in sand, from low tide to about 100 metres.

Taxonomy: Although there exists a possibility that *sulcata* may yet prove to be a full species, the available evidence indicates that it intergrades with *A. exigua* and that it appears to replace it geographically. Unfortunately the variable development of the axial sculpture sometimes renders it difficult to separate from the nominate subspecies, although the stronger, bifid parietal tooth is usually a reliable character. As indicated above, a set of four specimens from the Cuming collection consists of two *exigua* and two *sulcata*.

Ancilla (Chilotygma) minima Thiele, 1925

Figs 69, 243, 254–256, 260, 262

Ancilla (Chiloptygma) minima Thiele, 1925: 155 (189), pl. 21 (33), fig. 14. Type locality: Bagamoyo, Kenya.

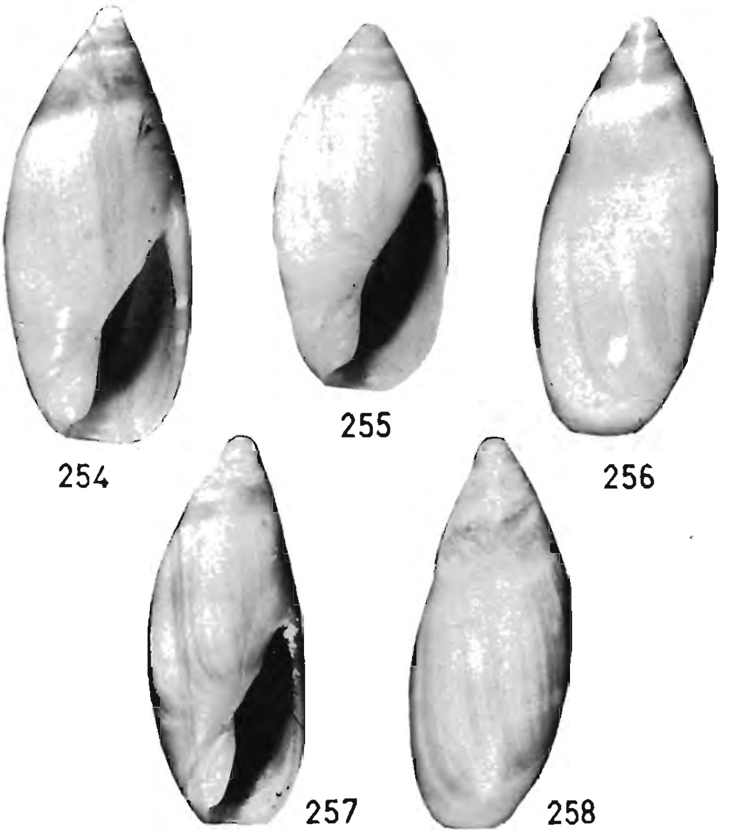
Diagnosis: Shell ovate-cylindrical, breadth/length 0,44–0,53, spire orthoconic, angle 58°–70°, aperture/total length 0,49–0,59; general characters as in *A. exigua* but parietal denticle much weaker and columella pillar narrower; colour white. Maximum length 11,4 mm.

Description:

Quantitative (N = 10):

Breadth/length: 0,44–0,53 (M = 0,49; SD = 0,02)
Aperture/total length: 0,49–0,59 (M = 0,54; SD = 0,03)
Spire angle: 58°–70° (M = 62,1°; SD = 3,6°)
Maximum dimensions: 11,4 × 5,0 mm
Minimum adult dimensions: 6,2 × 3,3 mm

Shell ovate-cylindrical, greatest width median, both sides of body whorl evenly convex; spire fairly low to high, orthoconic, sometimes cyrtoconic; spire whorls flattened, their sutures completely masked by callus. Aperture lanceolate, acuminate behind, where labrum is incurved to form an anal notch; greatest width of aperture median, curved and tapering slightly anteriorly; siphonal notch absent, base only slightly oblique. Surface smooth, with very fine microshagreen sculpture



Figs 254–258. *Ancilla minima* Thiele, 1925, and *A. iota* sp. n. 254–256, *A. minima*, Kikambala, NM J443; 254, 256, 11,4 × 5,0 mm; 255, 8,8 × 4,1 mm. 257–258, *A. iota*, holotype, 7,6 × 3,3 mm.

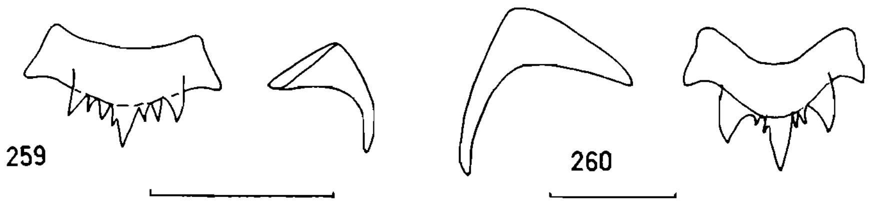
along anterior border of fasciolar band and on columella pillar. Ancillid groove/band and labral denticle absent. Fasciolar band slightly declivous, slightly convex, anterior fasciolar groove rather deep. Columella pillar small, 0,40–0,49 of length of labium, its lip gently convex; columella lirae coarse, 2–3 in number. Paries with a thick, wide callus, extending up past end of aperture as a ridge-like thickening; labium usually with a small projection at level of termination of posterior fasciolar groove. Labrum thickened, slightly concave and prosocline in side view.

Teleoconch whorls about 3,5. Protoconch (Fig. 70) narrowly domed, of 1,5 whorls, maximum diameter about 1,0–1,3 mm, but limits not clear.

Translucent white with fine, vitreous axial hair-lines.

Operculum transparent yellow with fine radial and concentric striae; length about 0,89 of aperture.

Radula (Fig. 260): rachidian plates strongly arched, tricuspidate, with strong median cusp, intermediary denticles 1–2, weak; lateral plates with long uncinus; number of rows about 44.

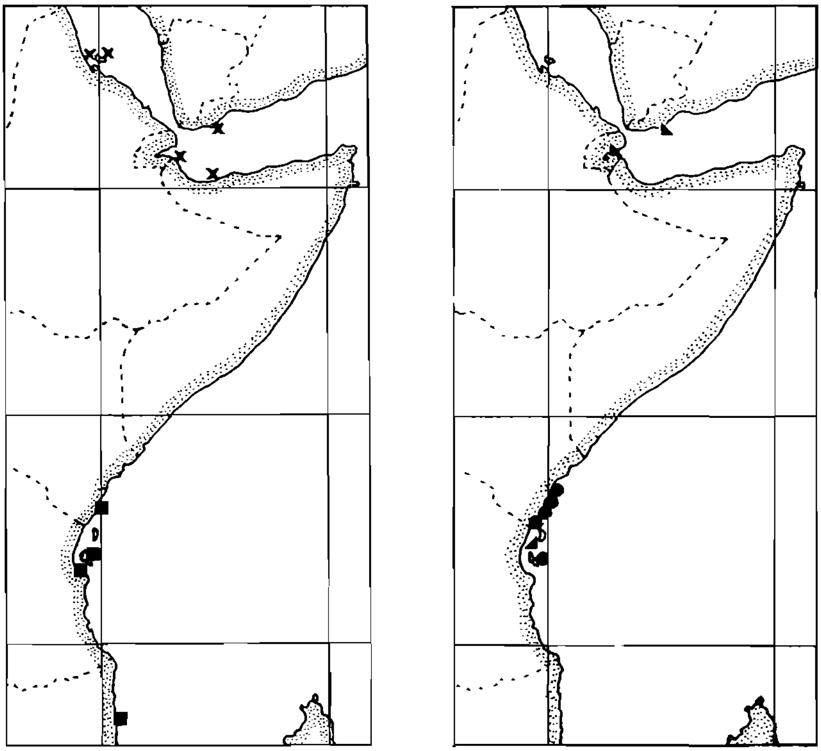


Figs 259–260. *Ancilla* species, camera lucida drawings of radulae; scale line = 0,05 mm. 259, *A. e. exigua*, Aden; 260, *A. minima*, Kikambala.

Distribution (Fig. 262): Kenya and Tanzania.

Material examined: KENYA: Shimoni (BM(NH): J. Taylor, one; NM G7851: Mrs B. Hooper, two); Gazi (NMW, RSM and IRSN: Preston, four); Mombasa (NMW: Wood, several; NM H9683: W. Falcon, one, BM(NH): McKinnon Wood, eight); Kikambala (NM J443: Mrs B. Hooper, three). TANZANIA: Zanzibar (BM(NH): 1904.10.20.50–57: G. T. Last, seven).

Type material: Holotype in Zoologische Museum, Berlin, leg. Sander (fidé Thiele, 1925).



261 262

Figs 261–262. *Ancilla* (*Chilotygma*) species, distribution. 261, *A. exigua*: ✕ = *A. e. exigua*, ■ = *A. e. sulcata*; 262, *A. minima* (●); *A. iota* and *A. murrayi*; (◢) and *A. testudae* (◣).

Habitat: burrowing intertidally in sand; 'sand bar in mangrove swamp' (label with BM(NH) Shimoni specimen).

Taxonomy: The Gazi examples examined in various institutes were distributed by Preston under the M/S name '*Ancilla aethiopica*'.

A. minima is closely related to *A. exigua*, but differs in the much weaker parietal ridge, slightly longer, narrower columella pillar and invariable white coloration.

Ancilla (Chilotygma) testudae (Kilburn, 1977)

Figs 65, 244, 262

Chilotygma testudae Kilburn, 1977: 19, fig. 4. Type locality: Djibouti.

Remarks: This distinctive species is easily identified by its transversely-ridged paries. Specimens bearing the M/S name '*Ancilla shoplandi* Jousseaume' have been seen in several European collections.

The following material, additional to the type series, has been examined. Aden (NMW: Tomlin, one; BM(NH) 1900.2.13.33–34: Shopland, two). 'Persian Gulf' (BM(NH): Townsend, one). Loc.? (RSM: Salisbury, three).

The operculum is transparent yellow and similar to that of *A. minima* and *exigua* in form.

Ancilla (Chilotygma) iota sp. n.

Figs 67, 245, 257–258, 262

Diagnosis: Shell translucent, narrowly oblong-fusiform, breadth/length 0,43–0,52; spire high, angle 48°–61°, apex papilliform, sutures covered by thin callus, aperture/total length 0,51–0,56; columella pillar narrow with 2–3 lirae; parietal callus forming a linguiform ridge at posterior end of aperture; yellowish-white. Maximum length 7,6 mm.

Description:

Quantitative (N = 10):

Breadth/length: 0,43–0,52 (M = 0,48; SD = 0,08)
Aperture/total length: 0,51–0,56 (M = 0,54; SD = 0,02)
Spire angle: 48°–61° (M = 52,5°; SD = 4,0°)
Maximum dimensions: 7,6 × 3,3 mm
Minimum adult dimensions: 4,9 × 2,2 mm

Shell translucent, narrowly oblong-fusiform, sides of body whorl gently convex, greatest width median; spire high, more or less orthoconic (occasionally cyrtoconic), with papilliform apex; spire whorls slightly convex, sutures masked by callus, but visible through transparency. Aperture widest medially, acute behind, curved anteriorly; siphonal canal relatively narrow, barely notched. Columella pillar moderately narrow and oblique, with 2–3 lirae, which are subequal in strength; lip strongly convex, with a deep basal sinus. Ancillid band and groove absent; fasciolar band slightly declivous, moderately convex, projecting slightly on paries; fasciolar groove shallow. Parietal callus forming a linguiform ridge, which encompasses posterior end of aperture and continues down back of labrum. Microshagreen sculpture visible only between columella lirae. Labrum relatively thin, slightly incurved posteriorly, edge straight and slightly prosocline in side view.

Teleoconch whorls 2,5. Protoconch (Fig. 67) narrowly domed, with relatively large, tilted first whorl; 1,5 whorls; maximum diameter 0,9 mm.

Colour yellowish-white, with paler axial hair-lines, columella pillar and aperture white.

Distribution: Zanzibar Channel, Tanzania, in about 220 metres.

Type material: Holotype (dimensions 7,6 × 3,3 mm) and one broken paratype BM(NH): John Murray Exped., Stn 113, 5°05'17"N, 39°13'39"E, 220 metres, sand, mud and pteropod shells. Ten intact paratypes, plus 16 fragmentary ones, BM(NH): John Murray Exped., Stn '105', 5°36'12"S, 39°13'12"E, 280 metres, brown mud over green mud, *or* 5°34'24"S to 5°37'00"S, 39°14'06"E to 39°14'36"E, 238 metres, green mud.

Taxonomy: This deep-water species resemble *Ancilla minima*, but is much smaller and more translucent, with a more cylindrical shape and a higher spire (mean spire-angle 62,1° and 52,5° respectively).

The problems associated with pin-pointing John Murray station No '105' are discussed under *A. murrayi*.

Ancilla (Chilotygma) murrayi sp. n.

Figs 68, 242, 252–253, 262

Diagnosis: Small, ovate-fusiform, left side more convex than right, breadth/length 0,50–0,59, spire blunt, 59°–69°, aperture/total length 0,51–0,59; columella pillar short, angular posteriorly, with 3–4 rather strong ridges; parietal callus thin with a small, oblique, median plait-like nodule; uniform, light orange-yellow without hair-lines, fasciolar and sutural regions darker; maximum length about 15 mm.

Description:

Quantitative (N as indicated):

Breadth/length: (N = 3): 0,51–0,59 (M = 0,54; SD = 0,04)
Aperture/total length (N = 4): 0,55–0,60 (M = 0,58; SD = 0,02)
Spire angle (N = 4): 59°–69° (M = 63°; SD = 5,0°)
Maximum dimensions: 14,8 × 8,7 mm (holotype)
Minimum adult length: 13,3 mm (lip broken)

Shell ovate-fusiform, asymmetrical with left side more convex than right, maximum width at or just behind midline; spire cyrtoconic to orthoconic, apex blunt; spire whorls slightly convex, sutures masked by callus. Aperture somewhat trigonal, greatest width median, anteriorly more or less parallel-sided, siphonal canal wide, only slightly notched, base slightly oblique. Columella pillar strongly twisted, 0,46–0,52 length of labium, its lip straight and oblique, forming an angle posteriorly; paries with a thin, translucent callus glaze, parietal ridge very slight, crossed at midline by a small, oblique, plait-like nodule, parietal callus forming a slight pad next to posterior angle of aperture. Fasciolar band not subdivided, rather convex, slightly declivous, its anterior groove rather wide and deep. Entire fasciolar band and columella microshagreened, with traces behind labrum and on paries. No ancillid groove or denticle.

Protoconch (Fig. 68) domed, 1,5 whorls, first one slightly tilted, maximum diameter about 1,8 mm, but base enveloped in callus.

Colour uniform light orange-yellow, darkening to medium orange-yellow in sutural and fasciolar regions, without light hair-lines; protoconch and columella white.

Distribution (Fig. 262): Zanzibar Channel, Tanzania.

Type material: Holotype, BM(NH), 5°34′24″S, 39°14′06″E to 5°37′10″S, 39°14′36″, 310 metres; John Murray Exped., Stn 105. Paratopotypes three, BM(NH), same data.

Habitat: fine grey mud (traces inside apertures) in about 310 metres.

Remarks: *A. murrayi* is superficially very similar to *A. sarda*, which inhabits somewhat shallower water in the same area, resembling it particularly in its asymmetrical form and general coloration. It differs in the presence of a small transverse mid-parietal pleat, in the absence of light hair-lines, in its larger protoconch, stronger columella pleats and posteriorly angular columella lip. From other *Chilotygma* species it differs in its orange colour. From *A. minima* and *A. exigua* it further differs in its much larger size and broader protoconch, and from *A. testudae* in its greater breadth, larger apex and single parietal fold.

Some doubt is attached to the type locality. The two John Murray labels bear the station number 105, with the depth 310 metres. The list of stations given by Sewell (1935) contains a station 105 A and a 105 B, with depths of 280 and 238–293 metres respectively. It is impossible at this stage to ascertain which station is referred to, but a previous curator has appended the co-ordinates for 105 B, which, like this material, was collected by Agassiz trawl. This view is here accepted. Fortunately the two stations are only slightly distant from one another.

ACKNOWLEDGEMENTS AND ABBREVIATIONS

A list of institutes and individuals, whose cooperation has made this revision possible, follows. In particular, however, I wish to thank malacological assistant Mrs Ruth Fregona for preparing the line drawings and colour plate for this paper, and for her aid in many other ways. Mr Allan Jenner of Alberton kindly loaned both specimens and radula slides from his private collection. The numerous other amateurs who assisted with material and information are acknowledged in the text.

AMS	Australian Museum, Sydney: Dr W. Ponder.
ANSP	Academy of Natural Sciences of Philadelphia: Dr R. Robertson.
BM(NH)	British Museum (Natural History): Dr J. Taylor, Ms Aileen Blake, Ms Kathie Way.
ELM	East London Museum, East London: Mrs E. Roscoe.
HUJ	Hebrew University, Jerusalem: Dr H. K. Mienis.
IRSN	Institut Royal des Sciences Naturelle de Belgique, Brussels: Dr J. L. van Goethem.
MM	Manchester University Museum: Mr Charles Pettitt.
MHNG	Muséum d'Histoire Naturelle, Geneva: Drs E. Binder, C. Vaucher.

MHNP	Muséum d'Histoire Naturelle, Paris: Dr P. Bouchet, Ms A. M. Testud.
NM	Natal Museum, Pietermaritzburg.
NMV	Naturhistorisches Museum, Vienna: Dr O. E. Paget.
NMW	National Museum of Wales, Cardiff: Dr J. Chatfield.
RGL	Rijksmuseum van Geologie en Mineralogie, Leiden: Dr G. E. van de Groot.
RNHL	Rijksmuseum van Natuurlijke Historie, Leiden: Dr E. Gittenberger.
RSM	Royal Scottish Museum, Edinburgh: Mr David Heppell, Dr Graham Oliver.
SAM	South African Museum, Cape Town: Dr T. Gosliner.
TAU	Tel-Aviv University: Professor A. Barash.
USNM	National Museum of Natural History, Washington: Dr H. Rehder.
ZMA	Zoologisch Museum, Universiteit van Amsterdam: Dr H. E. Coomans.
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